ANNUAL REPORT OF THE COMMISSIONER OF PATENTS.

REPORT

OF

THE COMMISSIONER OF PATENTS,

FOR THE YEAR 1845.

February 24, 1846.

Read, and referred to the Committee on Patents.

Patent Office, *January*, 1846.

Sir: In compliance with the act of Congress, entitled "An act in addition to the act to promote the progress of science and the useful arts," approved March 3, 1837, the undersigned has the honor to submit his annual report, exhibiting the operations of the Patent Office during the year ending December 31, 1845.

The whole number of applications for patents received during the year 1845, is *twelve hundred and forty-six.* The whole number of caveats filed during the same time is *four hundred and fifty-two.*

The number of patents issued in 1815 is *five hundred and two,* including six re-issues, six additional improvements, and seventeen designs; classified and alphabetical lists of which, with the names of the patentees, are annexed, marked K and L.

During the same period *four hundred and seventy* patents have expired, a list of which is annexed, marked M.

There have also been eighteen applications for extensions, three of which only have been granted.

The claims embraced in the respective patents issued during the year 1845 are also hereto annexed, marked N.

The receipts of the office for the year 1845, including duties and fees paid in on applications for patents, caveats, re issues, additional improvements, extensions, and for copies, amount in the whole to $51,076 14; of which sum $8,223 33 have been repaid on applications withdrawn, and for money paid in by mistake, as per statement marked A.

The expenses of the office during the year 1845 have been, for salaries $15,545 20; temporary clerks, $4,097 09; contingent expenses, including postage, $8,224 58; compensation of district judge, $100; library, $813 04; agricultural statistics, $2,392 41; amounting in the whole to $31,172 32; leaving a net balance of $11,680 49, to be credited to the Patent Fund, as per statement marked B.

There has also been expended during the year past, under the act of

Ritchie & Heiss, print.

March 3, 1837, the sum of $2,938 75 for the restoration of records and drawings, and the sum of $593 58 for duplicate models, as per statement marked C.

The whole number of patents issued by the United States for inventions, up to January, 1846, is fourteen thousand five hundred and twenty-six.

The general business of the office, as well as its receipts, has, during the year past, greatly increased over that of any former year. The excess of applications over the number received in 1844, is *two hundred and one;* the excess of caveats filed during the same period, compared with the former year, is *seventy-two*, and the excess of receipts, $9,850 08. The statement hereto appended, marked D, will exhibit the progress of the business of the office from January 1, 1840, to December 31, 1845, inclusive, and will be interesting, inasmuch as it furnishes abundant proof that the march of improvement in the sciences and arts in this country continues to be rapidly onward.

The balance in the treasury to the credit of the Patent Fund on the 1st January, 1846, was $182,459 69, as will appear from the statement of the Register of the Treasury, and the note appended, marked E.

In accordance with the usage adopted by my predecessor, I have required of the two principal examiners, reports showing the progress of invention in this country during the past year, as they have been brought under the view of the Patent Office, which are hereto annexed, marked G and H. They are referred to as very favorable proofs of the talents and industry of those two officers, and as furnishing interesting reviews of the progressive march of the arts. It will be seen, by reference to those reports, that the past year has not been barren of valuable and important inventions and improvements; and that the inventive genius of our countrymen has suffered no abatement in the intensity of its activity, nor in the value and utility of its products.

In connexion with the scientific operations of the Patent Office, I will embrace the opportunity to state, that I have received from Professor Morse an interesting account of the different magnetic telegraphs now in operation in Europe, made up from materials obtained by personal examination, and which will be found in paper marked I. I am happy to add, that Professor M.'s own brilliant invention, by which thought is conveyed with the rapidity of the lightning's flash, is still pre-eminent over all others of a similar character now in use in Europe.

By the act of Congress of June 17, 1844, making appropriations for the civil and diplomatic expenses of the government, &c., the sum of $700 was appropriated for covering the coping of the Patent Office, and the further sum of $600 was appropriated for an iron railing on the portico and for lamp posts. The whole of the last mentioned sum was expended in the latter part of the year 1844, by my predecessor, and the work faithfully and substantially executed.

The sum appropriated for covering the coping was, after the work was commenced and nearly finished, found to be insufficient to complete it. Deeming it imprudent to leave it in an unfinished state, I directed the balance required to complete it, amounting to $59 07, to be charged to the contingent account of the office.

The Patent Office building is now in thorough repair, and will require no appropriation for the present year, to keep it in a state of preservation.

My predecessor, in his last annual report, deemed it his duty, in consequence of the great inconvenience arising from the increase of models, rendering classification almost impossible, and the transaction of the daily business of the office very difficult, to recommend the construction of one of the wings contemplated in the original plan of the building. The experience of the short time during which I have filled the office of Commissioner has convinced me of the necessity of an enlargement of the Patent Office building. The increase of the business of the office is not only rapidly multiplying the models of both patented and rejected inventions, but it imperiously calls for an addition to the examining and clerical force of the office. And, as the rooms at present appropriated to the reception and classification of the models, and the use of the clerks, are fully occupied, provision will have to be made for the latter, (if Congress shall authorize an increase of their number) as well as for the former. I would, therefore, respectfully submit, in view of the constantly and rapidly increasing business of the office, that provision should be made for the construction of both wings, agreeably to the original plan. One wing would be immediately occupied by the classified models, and the other would, in a few years, be necessary for the accommodation of the official corps of the office.

An estimate of the expense of erecting the two additional wings, made at my request, by a distinguished architect, is herewith submitted, marked F.

In connexion with the subject of the enlargement of the Patent Office building, I would respectfully call the attention of Congress to the necessity of an increase of the examining force of the office. The present board of examiners consists of two principal examiners, and two assistants. The last addition to the examining force was authorized by the act of March 3, 1839. By reference to the statement marked D, exhibiting the progress of the business of the office from January 1, 1840, to December 31, 1845, inclusive, it will be seen that the whole number of applications for patents during the first mentioned year was 765, and during the year 1845 they amounted to 1,246; thus nearly doubling in number since 1840, and since the last addition to the examining force was authorized. During the last year the number of applications has exceeded that of any former year, except 1844, *three hundred and ninety-nine*, and the number of caveats filed *one hundred and thirty-seven.*

The increase of the number of applications does not exhibit the actual increase of the business of the office. Each application adds to the labors of the examiners and clerks in nearly a quadruple ratio, as almost every case requires two or three examinations before it is decided, leading to more or less correspondence in relation to it.

The great addition to the number of new applications, during the two last years, has rendered it physically impossible for the examiners to keep up with the business of the office, even with the most arduous and persevering efforts, aided by the experience of years on the part of both of them.

An addition to this branch of the force of the office has, therefore, become imperatively necessary; and if it should not be made, the inventor must be subjected to long and unreasonable delay before his claims can be examined. The crowded state of business during the last year has already occasioned complaints and censures against the office, on the part

of impatient applicants, who were not apprised of the causes which prevented the seasonable examination of their cases. These causes were not to be found in the want of industry on the part of the examining force, but in the fertility of invention so creditable to our countrymen, which outstripped the physical capacity of the examiners to perform all the labors which were thus accumulated upon them.

When it is borne in mind that the Patent Office is wholly sustained by duties paid in by inventors—having, since its re organization in 1836, not only carried on its operations without aid from the treasury, but having each year contributed a surplus to the Patent Fund, a part of which is yearly appropriated for the collection of agricultural statistics and the purchase and distribution of seeds—it cannot be deemed unreasonable on their part that Congress will, with the money thus furnished by themselves, make every necessary provision for its continued efficacy and usefulness.

It is believed that the addition of one principal examiner and one assistant will be sufficient to enable the office, in the present state of its business, to perform its duties without unreasonable delay. But, if its business should continue to increase in the same proportion in which it has during the past two years, which is very probable, the addition to its force above recommended will not be long adequate to the performance of its duties.

Whether or not provision shall be made for any thing more than the present necessities of the office, is respectfully submitted to the wisdom of Congress.

In connexion with this subject, I feel bound to reiterate the recommendation of my predecessor, made in his last report, in relation to an increase of the salaries of the scientific corps of the office. The office of examiner of patents is one of the most difficult and responsible offices under the government. It requires the highest attainments in the sciences, and a soundly discriminating mind, to which may be added the most unquestionable integrity of character. An examiner should be a living encyclopedia of science, if the expression may be used. His multifarious duties require an intimate and thorough knowledge of the whole circle of science and art, together with a knowledge of modern languages—particularly of the French and German—and the most attentive and incessant mental labor. Yet, for all these high qualifications, and for labors scarcely second in intensity to those required by any officer in the government, the principal examiner is allowed only a salary of $1,500 per annum, and his assistant but $1,250. That it is wholly inadequate, as a compensation for such qualifications, must be evident to every one capable of appreciating the value of the talent and capacity equal to the duties required of an examiner of patents.

That it is not sufficient to retain the services of those capable of filling that place, this office has had proof in more than one instance. During the present year the office has lost the services of one of the most capable and efficient persons who was ever in its employment, and who was induced to resign by the inadequacy of the compensation which he received, and the more alluring prospects held out to him in other pursuits; and in filling the vacancies which have occurred by resignation and promotion in the examining department, since the undersigned has been at the head of the office, he has had to encounter the difficulty of securing

the services of persons of the requisite talents and attainments, in consequence of the total inadequacy of the compensation. He has had the mortification of being defeated, in his efforts to procure the services of suitably qualified persons, by a railroad corporation, which was able to pay more for such services than he was authorized by law to pay.

In urging an increase of the salaries of the examiners, the undersigned is happy to find himself sustained by the great body of the enlightened inventors of this country, who desire earnestly that the men who are to pass upon their valuable rights shall be not only men of integrity, but of the highest order of talents and scientific qualifications. They desire that the class of officers to whom the law commits their interests shall be capable of comprehending the many intricate and difficult questions submitted to them; and, as the Patent Office is sustained by a heavy tax on their ingenuity, they feel that it is due to them that a sufficient sum should be appropriated, in the form of salaries, to induce men of the requisite capacity to undertake the various and ungrateful duties of examiners.

For additional reasons in favor of an increase of the salaries of the scientific corps, I would respectfully refer to the last report of my predecessor, in whose views and recommendations on this point I concur.

The experience of this office, and the construction given to it by the courts, have proved that the existing laws are defective in many particulars; some of the most prominent defects in which I will proceed to point out.

1. In relation to the power of the chief clerk to act in the place of the Commissioner during his absence.

Under the second section of the act of July 4, 1836, it was believed that the chief clerk is clothed with the power to perform all the functions of the Commissioner, as well during his absence as when a vacancy existed in the office. Such, I understand, was the construction of the law by my predecessor, whose practice was in conformity to it. And, finding such construction and practice to exist when I entered upon its duties, I made no change in that respect. Recently, however, the correctness of that construction has been questioned by the United States district court in Massachusetts, and the authority of the chief clerk to perform the functions of the Commissioner during his absence denied. I also understand that this opinion of the court in Massachusetts is sustained by other eminent legal authorities. The practice may, therefore, be regarded as doubtful, if not wholly unauthorized by law.

If the construction and practice in relation to this matter be not correct, this office is placed in a situation of great inconvenience, inasmuch as in case of the sickness or necessary absence of its official head, its functions must, for the time being, cease.

The framers of the patent law, as the practice of my predecessor shows, contemplated no such result; and if they failed to provide for such a contingency, it was evidently because they did not duly weigh the meaning of the language which they used in the section of the law above referred to. To provide against the inconvenience and the evils which may result from such a defect in the law, some legislation will be necessary.

And, as the chief clerk has, since the reorganization of the office in 1836, officiated more or less as the acting Commissioner, and has signed many patents and other papers upon which important and valuable rights de-

pend, it is respectfully submitted if it is not expedient to make those acts valid by a declaratory law on the subject.

2. Some doubt has arisen in relation to the construction of the 13th section of the act of July 4, 1836, in relation to the power of the Commissioner to enlarge the claim of the patentee who surrenders his patent for correction and re-issue.

The 13th section provides "that, whenever any patent which has heretofore been granted, or which shall be inoperative or invalid by reason of a defective or insufficient description or specification, or by reason of the patentee claiming in his specification, as his own invention, *more* than he had, or shall have, a right to claim as new, if the error has or shall have arisen by inadvertency, accident, or mistake, and without any fraudulent or deceptive intention, it shall be lawful for the Commissioner, upon surrender," &c., to cause a new and complete patent to be issued.

On the part of many able jurists, who are thoroughly acquainted with the patent law, it is believed and contended that, under the section above quoted, the Commissioner has power to cause the issue of a patent only in cases where the patentee has claimed as his invention *more* than he was justly entitled to.

Such a construction of the provision in question would authorize the Commissioner to *limit* the claim of the patentee when he had claimed too much, but not to *enlarge it* when he had claimed too little; notwithstanding the new matter claimed, and to secure which the patent was surrendered for re-issue, was particularly set forth and described in the specification and drawings, and represented in the model.

Such a construction is in conflict with every sound principle of justice, and it should forthwith be remedied by an amendment of the law relating to this matter. It could not have been intended by the framers of the provision in question that the inventor should be deprived of the benefit of his invention, because, from inadvertence, mistake, or accident, he had failed *to claim* it all, notwithstanding he had set it forth in his specification, drawings, and model.

And, as the phraseology of the section of the act above quoted admits of doubt, it is respectfully submitted whether or not it is expedient to remove this doubt by additional legislation.

3. The next provision of the law in respect to the construction of which doubt has arisen, is that which relates to the degree and extent of the use of an invention, before a patent is obtained for it, which shall constitute an abandonment of it to the public.

Under the second section of the act of March 3, 1839, it has been held by the Patent Office that the sale or prior use of a machine within two years from the date of its invention was no proof of the abandonment of the invention to the public; and by that construction of the provision of the law referred to, both the office and inventors have, until recently, been guided.

It was believed that, upon a fair and liberal construction of the section referred to, if not by its very terms, the inventor is entitled to two years during which he might make experiments with a view to perfect his invention, or sell to others machines which he had constructed during that period, without invalidating his right to a patent.

But, recently, some of the judicial tribunals have been inclined to take a different view of that provision in the seventh section of the act of 1839,

and one of the circuit court judges, I have been informed, has, in one case, directly ruled, and so instructed the jury that the sale of a single machine is evidence of the abandonment of the invention to the public, and of course would destroy the validity of a patent issued under such circumstances.

It will be obvious that such a construction of the provision under consideration must greatly cripple the efforts, and, in many instances, the means of inventors. An invention does not, as did Minerva from the brain of Jove, spring from the inventor's brain perfect in form and action; on the contrary, it often requires years of painful thought and study, and numerous and varied experiments, to bring it to perfectibility. It also requires, oftentimes, a very considerable expenditure of money in constructing machines, and in making experiments. And as many, if not a large majority of that worthy class of men, are limited in their means, they find it a very great convenience, and sometimes absolutely necessary, to permit others to use publicly their machines, for the purpose of testing their perfectibility by experiment, and to sell them for the purpose of procuring the means to pursue their own experiments, and finally to obtain a patent.

In the judgment of the undersigned, nothing can be more just and reasonable than that the poor inventor should have the privilege of permitting others to use his machine by way of experiment, and of selling to others to use during the term of two years prior to his application for a patent, without invalidating his right to the same, supposed until recently to have been extended to him by the act of 1839. And it is, therefore, hoped that Congress will, by some further legislation upon the subject, clear the law of all doubt upon this point.

4. By the same section of the act of 1839, it is provided that every person or corporation who may have purchased any newly invented machine, manufacture, or composition of matter, prior to the application of the inventor for a patent, "shall be held to possess the right to use, and vend to others to be used, the *specific* machine," &c., so made or purchased, without liability therefor to the inventor, or any other person interested in the invention.

The Patent Office, believing that it was construing this provision according to its letter, as well as its spirit, has held that the right of the constructor or purchaser of a new machine, manufacture, or composition of matter, extended only to the specific and identical machine so purchased or constructed. By the judicial tribunals, however, it has been construed differently, and held that the constructor or purchaser, under such circumstances, not only acquired a right to use and vend the identical machine, or thing made or purchased by him, but also a right to the *invention* itself.

The effect of such construction of the provision referred to is, to give the constructor or purchaser of a machine, or other thing invented, a coequal interest in the *invention* with the inventor himself. It is obvious that, however loose and unguarded the language of the statute in relation to this matter may be, such a construction as that which has been given to it by the judicial tribunals could not have been contemplated by its framers. They could have contemplated no such injustice to the inventor, and it is therefore respectfully submitted if this provision does not also need amendment.

5. By the 18th section of the act of July 4, 1836, by which the Patent

Office was reorganized, provision is made for the extension of patents under certain circumstances for an additional term of seven years, and it is also expressly provided that "the benefit of the renewal shall extend to assignees and grantees of the right to use the thing patented, to the extent of their interests therein."

Under this provision, the board to whom the question of extension is submitted have heretofore held that the benefit extended as well to the assignees and grantees, as to the patentee. And this construction of the law has been sustained by some of the judicial tribunals, while it has been reversed by others.

In the eastern circuit, it was held by the late lamented Justice Story that the benefit of the extension *did not* extend to the assignees and grantees; and the distinguished Chief Justice of the United States has held just the contrary in the Maryland circuit, and sustained the construction given to this provision of the statute by the board of extension.

Already much litigation and consequent injury to both patentees and purchasers have grown out of this subject. A suit is now pending in the Supreme Court of the United States in relation to the well-known Woodworth's patent for a planing machine, involving very heavy pecuniary interests, in which this question is one of the points raised in the case. It is, therefore, a matter worthy of consideration if this conflict of opinion in the courts had not better be settled by the more speedy and less expensive process of legislation.

6. In all cases in which patents are refused by the Commissioner, the applicant, if he is dissatisfied with the decision of that officer, has two remedies, viz: one by appeal to the chief justice of the circuit court for the District of Columbia, and the other by a proceeding in equity against the Commissioner to compel him to issue a patent.

The 16th section of the act of July 4, 1836, and the 10th section of the act of March 3, 1839, which provide a remedy in equity for the aggrieved applicant, have failed to designate the place where these proceedings shall be had; and, consequently, the Commissioner may be harassed with suits in equity in every court of the United States having equity jurisdiction; at the same time subjecting him to the necessity of leaving his official duties at the seat of government at any time in order to attend personally to these proceedings. Suits may be pending at the same time in extreme parts of the Union, thus rendering it impossible for him to attend in person, if he should be required, as he is liable to be. No case has yet occurred in which the Commissioner has been compelled to attend in person; yet it would be best to guard against such a contingency, particularly as it is now held that the chief clerk has no power to perform the duties of the Commissioner in his absence, and the office would be left, in such an event, without an official head.

Two suits in equity are now pending against the Commissioner in the circuit court for the district of Pennsylvania, in which, as it has not been necessary for me to attend, I have employed counsel, and in one of which I have had the question of jurisdiction raised.

In the course of the administration of the office many other defects and ambiguities have been observed in the acts now in force, which it is now unnecessary to refer to; but if Congress should conclude to revise the present patent acts, (which I will take this opportunity to recommend,) they will, if required, be particularly pointed out.

In connexion with the revision and amendment of the present patent laws, I would remark that, in my judgment, some additions to the present enactments are necessary for the more effectual encouragement and protection of inventors and patentees.

The existing laws, while professing to give to the inventor the exclusive enjoyment of his invention for the term of fourteen years, do, in fact, afford to him but very little protection. The fruits of his genius and his toils are constantly liable to be wrested from him by the unscrupulous and dishonest, who, too often countenanced by public opinion, are apt to regard the rights of the inventor as the fruits of a monopoly which it is a merit instead of a wrong to break down and destroy; and the more valuable the invention, the more liable is the patentee to this species of invasion and injury, as there is more inducement held out to its perpetration. The stealthy thief and the midnight burglar are justly regarded as the pests and enemies of society, and are therefore seized and punished by penalties severe in proportion to the turpitude of their crimes; yet their depredations are committed on things which are made by law the subjects of property, and which may be acquired by industry or by purchase. The right of the inventor to his invention, in the judgment of all enlightened minds, cannot but be viewed as far more sacred than mere things of property. It is a mental creation, or rather the discovery of a principle or thing never before known to the world, and may be, and very many inventions have been, often productive of countless blessings to the human family, affecting their destinies as individuals and as communities through all time. When the wonderful discoveries of a Watt, a Fulton, a Whitney, and an Arkwright, and the great results to individuals and to nations which have followed from them, are contemplated, it is not difficult to realize the value of the splendid gifts which science, through their instrumentality, has bestowed upon man, nor to estimate the claims which the true inventor has upon society. He may truly be called the pioneer of civilization, the explorer of the unknown world of science and art. And yet how many of those truly great benefactors to their race have fallen victims to ingratitude and wrong, and gone down to their graves in penury and sorrow. The case of Eli Whitney, our countryman, the inventor of the cotton gin, is but one among innumerable instances in which the fruits of splendid genius have been wrested from its possessor by the unprincipled depredator upon patent rights. It is familiar to all that that great inventor, whose name stands out like a bright and lustrous star in the constellation of genius, was compelled to expend all the profits of his invention in fruitless efforts to protect it from infringement, and finally died a victim to debt and disappointment.

Many valuable inventions are now used in secret and kept from the world, on account of the impunity with which patent rights can be infringed, secrecy being a better protection to the inventor than the law.

These reflections are indulged in with a view to awaken in the public mind a proper estimate of the value of the toils and labors of the inventor, and of his claims to full and effectual protection in the enjoyment of the fruits of his genius and skill, and to enforce with more emphasis the suggestions which I deem it my duty to submit in relation to such amendments of the law as may be necessary for the security of the rights of inventors. The principal difficulties which the patentee has to encounter, under the present laws, in enforcing his rights, arise from two circum-

stances: first, from the fact that the question of originality may be raised on every trial for infringement; and, secondly, the almost total inefficacy of the existing law to prevent infringement.

In every application, the question of the originality of the invention is thoroughly investigated by the Patent Office; and as it is decided affirmatively or negatively, the patent is issued or denied. If the patent is granted, it is very properly (as the office cannot claim infallibility) deemed by the law only *prima facie* evidence of the originality of the invention, and of the right of the patentee to recover damages for an infringement of his claim. Yet there should be some point at which this question should be deemed as conclusively settled, and the right of the patentee to recover made absolute, or the patent declared to be a nullity. Yet, under the existing laws, such is not the fact; and although the question of originality may have been decided by twenty juries, in as many different trials, it is just as much open to dispute in all subsequent trials.

This difficulty in the way of the patentee to recover for infringements, in cases in which the invention is a very valuable one, and the infringer a wealthy corporation, amounts almost to an insuperable one, as he is kept in the law, and harassed by litigation, until the term for which his patent runs, expires; and he is left without adequate remuneration for his invention, and sometimes made poorer than when he commenced the fruitless attempt to vindicate his rights by an appeal to the law for redress.

In view of the inefficiency of the existing enactments upon the subject, to protect the inventor, I have deemed it my duty to recommend that the law should be so amended as to provide some process for the repeal of a patent within a limited period of time after it shall have been issued, in which all matters tending to invalidate it should be considered and forever settled.

The validity of the patent should be called in question only in this proceeding against itself; but in all suits by the patentee for infringements, the patent should be deemed conclusive evidence of his right to recover damages. Were such a provision incorporated into the law, it would compel all persons contesting the validity of a patent, to proceed in the first instance against the patent itself, in order to set it aside. And the courts would be relieved from an immense mass of litigation growing out of the disputed claims of patentees, and the patentees would not be subjected to the tedious and costly process of vindicating their claims to the invention patented, in every suit which they might institute for its infringement.

This proceeding against the patent itself, with the view of procuring its repeal, is not new in the legislation of other nations. It has for many years been the law of France, and has been found to operate beneficially, as well to patentees as to parties interested in the repeal of patents.

If it should be deemed expedient to engraft upon the present system a provision for the repeal of patents which may be invalid for any cause, the wisdom of Congress will devise such amendments to the existing laws as may be deemed necessary to effect the purpose.

In connexion with this subject, it may not be inappropriate to remark, that in all trials in which the validity of a patent may be involved the court should be aided by the counsel of persons learned and experienced in the art to which the patent relates. And particularly would this be expedient if Congress were to authorize a proceeding against the patent itself, for the purpose of effecting its repeal. The tribunal before which

the question should come should be constituted in part of persons learned in the art or science to which the patent relates.

Another obstacle in the way of full enjoyment, by the patentee, of the benefits of his invention, and which I have before alluded to, is the almost total inadequacy of the existing provisions of the law to protect him against infringement upon his rights.

By the 14th section of the act of July 4, 1836, courts are authorized to treble the damages awarded to the plaintiff by the jury, in their discretion. If this provision could be administered according to its true spirit and intent, it would probably afford adequate protection to the patentee. But long experience has shown it to be practically inoperative.

In the first place, juries, aware that their verdicts may be trebled by the court, sometimes take that circumstance into consideration in making them up, and do not award so high an amount of damages as they would if they were not conscious that their decision could be revised by the court; and courts, too, are reluctant in taking the responsibility of increasing the damages awarded by the jury.

Again: irresponsible persons are employed by others, who have adequate means to respond, to depredate upon the rights of the patentee, who has no remedy except against the ostensible perpetrator of the wrong, and against whom a verdict would be utterly valueless. It is not an uncommon practice for one person possessing capital to furnish to another, who has none, the means to manufacture an article protected by a patent; thus screening himself from the consequences of a prosecution, while he enjoys all the profits resulting from the trespass.

Machines protected by a patent are also operated in secret; and as the patentee has no legal power to enter upon the premises of another to ascertain whether or not his rights are invaded, and courts, upon trials, have not the authority to cause a view to be had of the machine and manufacture thus carried on in secret, the patentee is left, in such cases, entirely without redress.

To remedy these defects in the patent laws, and to afford to the inventor that full and complete protection which the law designed he should have, it is believed that the following additional provisions would be effectual, namely: that on all trials for the infringement of a patent, the question whether or not the infringement was knowingly and wilfully committed should be left to the jury; and if they should find in the affirmative, in addition to the damages which they may award, the courts should order that all the goods protected by the patent, together with the machines by which they shall have been manufactured, shall be forfeited to the use of the patentee, and the defendant be mulcted in double costs. This remedy, it is believed, would be much more efficacious than the existing one. Perhaps it would be expedient to add, by way of penalty, imprisonment on refusal to respond damages.

And in all cases where it is believed that machines are operated in secret, courts should be authorized to cause an examination of the premises, in order to ascertain whether or not the use of the machine is an infringement of the rights of the patentee.

By the 11th section of the act of July 4, 1836, the Commissioner was directed to charge the sum of three dollars for each assignment recorded in the Patent Office. This provision of the act of 1836 was repealed by

the 8th section of the act of March 3d, 1839, and now nothing is required for recording assignments. Since the passage of the last mentioned act, the number of assignments sent to the office to be recorded has multiplied so much as to require all the time of one clerk, and part of that of another, in recording and comparing them. During the year 1845, the office received 2,108 assignments, and for recording the same it paid out the sum of $1,018 95 to temporary clerks, besides appropriating more than one half of the time of one of the permanent clerks in reading and comparing the originals with the record.

As more than three-fourths of these assignments are sent to the office by speculators in patent rights, they should not subject the Patent Fund to be charged with the expense of recording them. This portion of the duties of the office is daily increasing; and it is believed that it would not be deemed unreasonable to require some return to the office, by way of a small duty, for each assignment sent to it for record.

The law now requires the payment of a duty of twenty dollars on the filing of each caveat. As this proceeding entitles the caveator merely to notice of all subsequent applications interfering with his invention, the duty is too high in proportion to the benefit derived from the caveat. Besides, there are many persons who have made valuable improvements in the arts which they are willing to bestow upon the world, but do not wish that other persons should obtain patents for things which they have not been the first to invent, or have not invented at all, and who would secure their use to the public by depositing in the Patent Office a caveat containing a description of the invention, if the duty were not so high. It is, therefore, suggested that a duty of ten dollars on the filing of each caveat, without permitting it to become, as now, a part of the patent fee, if it should be subsequently converted into an application, would be equally productive to the revenues of the office, and would also result in much benefit to the public.

The board provided by law to decide upon applications for the extension of patents is composed of the Secretary of State, the Solicitor of the Treasury, and the Commissioner of Patents. The very arduous duties required of the two officers first named, appertaining to their respective offices, render it very inconvenient for them to attend to the sometimes long and tedious examinations necessary in cases of applications for extensions. A board, composed of the Commissioner and the principal examiners, would, from the nature of their present duties, in the belief of the undersigned, be more appropriate; and it is suggested if it would not be expedient to abolish the present board, and transfer its duties to the Commissioner and examiners.

As an efficient performance of the duties of the Patent Office requires the extensive use of scientific works, many of which can only be obtained in foreign countries at considerable expense, the usual appropriation will be required for that branch of the office. I have found the library belonging to the office to be deficient in many valuable works, which the experience of the office has found to be very necessary, many of which are of a costly character, and cannot be obtained with the sum which may be left of the usual appropriation, after paying for the current periodical works and publications taken by the office.

As the office is now in an unprecedentedly flourishing condition, its revenues greatly exceeding its expenditures, it may be deemed expedient

by Congress to make a more liberal appropriation for the library than has been heretofore made.

An increase of the library, at present very incomplete, will contribute to the convenience of the scientific corps of the office, and give them increased facilities for the discharge of their duties, and is even more important to the inventors, to decide correctly upon whose interests it is very necessary that the office should know what has been done in foreign countries; a knowledge of which it can derive only by scientific works published abroad.

In most of the foreign countries in which rapid advancement is making in the arts, publications are from time to time made of new inventions, containing both descriptions and drawings, which are found not only to be of very great benefit to inventors and to the public, but which have been the means of rendering essential aid to the operations of this office. In this country there has been no such provision for the publication of patents; and consequently, for want of the information which such a work would give to inventors, machines and processes of manufacture are invented over and over again, to be as often rejected at the Patent Office, for want of novelty. In addition to the disappointment and mortification which applicants under such circumstances suffer, they often incur large expenditures in perfecting their inventions, and in their efforts to procure patents for them. Whereas, if descriptions of the new patents issued were once a year, or oftener, published, both the disappointment and expense of applicants would be avoided, and the office itself relieved of the labor and trouble of examining inventions which had long before been introduced into public use.

As this office is now in the possession of ample means, which are likely to be increased by its continually growing business, I would respectfully renew the recommendation made by my predecessor in his last report, that the Commissioner be authorized to subscribe for a thousand copies of some well established scientific publication, on the condition that it should contain quarterly (or oftener) descriptions and drawings of all new inventions patented during the year, which the Commissioner might deem it expedient to cause to be published.

The report upon agriculture for the year 1845, hereto annexed, and marked J, will be found to contain a large mass of matter valuable and interesting to the scientific as well as the practical agriculturist.

It will be perceived, from the review of the season which it contains, that, as a general fact, the crops have not equalled in quantity those of the preceding year. While the wheat crop has exceeded in amount the product of former years, almost all other important crops of the country have fallen short. That is pre eminently the case with the potato and hay crops of the northern and middle States, and of the corn crop in many of the southern States. The result is to be attributed to the cold and dry weather which prevailed in the northern and eastern States in the early part of the season, and in the middle and southern States in the summer. But, while some of the States have suffered from the causes just mentioned, others have been more favored than ever; and, on the whole, we have reason for gratitude to the Giver of all good, for the munificent abundance which he has bestowed upon our favored country during the last year.

The great range of latitude through which our country extends, commencing midway in the temperate zone and extending to the tropics, and

embracing almost every variety of soil and climate, secures to us, for our own consumption, a sufficiency of nearly every description of product which can minister to necessity or luxury, besides furnishing a large surplus of many valuable products for exportation to foreign countries, the returns of which, in the productions of the labor and capital of other nations, add to our individual enjoyment and increase our national wealth.

In truth, our agricultural products form the basis of our immense foreign commerce, thus constituting the strongest ligaments which unite us to the great brotherhood of nations; contributing not only to our national wealth, but to the cultivation of amity and peace in our foreign relations, and to the progress of civilization at home. In view of these beneficent influences, which have their origin in this great arm of our national industry, its flourishing condition cannot but be satisfactory and encouraging to the true patriot.

The report of this year will show that this great branch of national industry is not only extending with the rapidly increasing number of our population, but that agriculturists themselves are awaking to a consciousness of the importance of their noble avocation, and are calling science to their assistance in their efforts to improve.

In the analysis of soils, products, manures, and the food of cattle and other stock, chemistry has already conferred immense benefits upon the agriculturist. Other sciences are also bestowing their valuable donations upon him. Nor is the inventor behind in this work of cherishing the agriculturist. His genius adds its splendid gifts to the rich charities of science, as will be seen by the numerous and valuable machines which have been devised and constructed to relieve the toils and facilitate the labors of the husbandman. The names of Eli Whitney, the inventor of the cotton gin, and Jethro Wood, the inventor of the cast-iron plough, will be ranked among the greatest of benefactors while man is doomed to earn his daily bread by the sweat of his brow.

In this branch of my labors I have been aided by the contributions of many distinguished friends of agriculture, whose communications will be found in the appendix to the agricultural report. And, among others, I have received several valuable papers collected by my late predecessor, the Hon. H. L. Ellsworth, and one from his own pen, relating to prairie cultivation, which will be found very interesting, and to which I would particularly refer, as containing much valuable knowledge derived from experience upon a subject of great interest to the government as well as to individuals.

Among other valuable papers furnished by Mr. Ellsworth, is a translation of an abridged French treatise upon the cultivation of the colza plant, by J. W. P. Lewis, esq., of Boston. The colza is a species of the cabbage, and is cultivated in France for its seed, which contains extraordinary oleaginous properties, and from which large quantities of oil are manufactured, of a quality for lights nearly equal to the best sperm, and which is now used in the different light-houses of that kingdom. Through the aid of Mr. Lewis, Mr. Ellsworth has also favored the office with a small quantity of the seed of both the summer and winter colza, which has been distributed to the members of Congress.

The potato disease, which has made such ravages in this country and in Europe during the last two years, has formed a prominent subject of

careful investigation, the results of which will also be found in the agricultural report, together with many valuable papers relating to that subject.

Of the last appropriation for agricultural purposes, I have expended nearly $1,000 for seeds of various kinds, and for preparing them for distribution, samples of each of which have been distributed to members of Congress. The number of packages distributed this year will exceed 50,000.

When it is considered that only $3,000 is appropriated for agricultural purposes, and one-third of that sum is appropriated for seeds, and much of the remainder expended for the mere copying of the report, it may justly be deemed a matter of surprise that such a mass of interesting matter has been collected and embodied as will be found in the agricultural report of this year.

It has been accomplished only by the most rigidly careful expenditure of the fund placed at the disposal of the Commissioner. In discharging this part of my duty, I have severely felt the want of sufficient means to collect important information for the purpose. And I am compelled to acknowledge, that without the kind and generous contributions of intelligent citizens devoted to the interests of agriculture, it would be impossible for this office to collect and to lay before the country so many interesting facts, and so much valuable information, in relation to the interests of this great and paramount branch of national industry.

If the Commissioner were provided with more ample means, the theatre of his operations in this branch of his duty could be greatly extended. At present the office has no means for making inquiry into the improvements of agriculture in foreign countries, nor for collecting rare and valuable seeds abroad. I am gratified in having it in my power to state that our consuls and other agents residing in foreign countries, evince great willingness to aid this office in its efforts to advance our agricultural interests at home, by the collection of valuable information and seeds in the countries in which they reside; but I have not been able to avail myself of the services of gentlemen holding official stations abroad, proffered in numerous instances, for want of the necessary means to defray the expenses of the purchase of seeds and their conveyance to this country; and thus are our agriculturists not only deprived of an early knowledge of the advance of the science of agriculture in other countries, but also of seeds which, in our extended country, would find a soil and climate congenial to their nature and habits, and would add much to the elements of national wealth.

During the present year, I have availed myself of the services of a very intelligent gentleman, formerly connected with this office, and now travelling in Europe, in collecting agricultural information in the different countries which he may visit. Those services were voluntarily tendered. If compensation had been required, I of course could not have availed myself of the services of the gentleman referred to, because I had not the means to meet the demand. Two valuable communications have already been received from that gentleman, which will be found in the appendix to the agricultural report, and much more is expected, which may not arrive in season for the present report.

When it is considered that much of the legislation of Congress, and millions of the treasure of the nation, are devoted, in one form and another, for the protection of manufactures, commerce, and other interests, it would

not seem unreasonable if a few thousands should be annually appropriated for the promotion and advancement of that greatest and most essential of all the interests of the country—the agricultural. The farmers themselves, while they cheerfully pay the millions of taxes demanded of them for the support of other interests, would not complain if a few thousands were added to their burdens for the promotion of their own.

If Congress should come to the conclusion to increase the means at the disposal of the Commissioner for the purpose above suggested, it would enable him not only to add much to the value and usefulness of the agricultural report, but to add new varieties to the different grain and vegetable crops now produced in the country.

In connexion with this subject, I deem it proper to remark that the sum now annually appropriated for agricultural purposes is taken from the Patent Fund, all of which has been paid into the treasury by the inventors, and which has been set apart by law for the promotion of the useful arts, and for the benefit of that class of citizens from whom it has been collected. They justly complain of this misapplication of the Patent Fund, and demand that it shall be appropriated to the increase of the efficiency of the Patent Office. I concur entirely in the justice of their complaints, and respectfully submit if it would not be expedient to apply the revenues of the office to the increase of its force, and to the objects to which, in a preceding part of this report, I have called the attention of Congress, and make the necessary appropriation for agriculture from other moneys in the treasury.

It was suggested in the last annual report of my predecessor that provision should be made for a permanent clerk, to aid in procuring the statistical information for the agricultural report. In the discharge of my duties in connexion with that subject, I have found that the services of a competent clerk are greatly needed. The numerous other duties devolving upon the Commissioner render it physically impossible for him to attend entirely to this portion of the business of the office, and he is obliged to require the labors of the regularly employed clerks in that department. It requires nearly the entire time of one clerk to read the domestic and foreign publications on agriculture, in order to make the necessary selections of matter for the report; and those services, which require sound discrimination and judgment, are paid for out of the sum placed at the disposal of the Commissioner for agricultural purposes, in the expenditure of which he has a very general discretion. Translations from foreign publications and works are also required, which are paid for out of the general agricultural fund.

It is therefore submitted if it would not be expedient to establish a permanent clerkship connected with the agricultural duties of the office, the salary of which should be adequate to command the services of a person skilled in statistics, and acquainted with foreign languages. It might be taken from the general sum appropriated for agricultural purposes, and would not add to the expenses of that branch of the office.

The object of the report on agriculture is to show the general progress of that branch of national industry, and the particular amount of agricultural products, so far as it is possible for the Commissioner, with the limited means at his command, to approximate to exactness and precision in his estimates of the crops.

In procuring materials for the report, he is compelled to rely on agricul-

tural publications, the voluntary contributions of intelligent and public spirited citizens, and the returns which he solicits from members of Congress. The means which he possesses for procuring accurate and reliable information are, therefore, very limited. With suitable legislation on the part of the several States of the Union, they might be made ample. If the legislature of each State were to require returns to be made annually of all its agricultural products, the results of which to be transmitted to the Patent Office, the Commissioner could furnish to the country, each year, a full and complete view of its agricultural products, and of the general progress of that branch of national industry. This information could be very readily obtained through the medium of the assessors of the taxes in the several towns and districts of a State.

Some of the States now require returns of the kind to be made by their assessors at certain periods. Much assistance in making up the agricultural report for the last year has been derived from the returns of the late census of the State of New York.

It is, therefore, hoped that the legislatures of the different States will turn their attention to this subject, and make provision for the collection of the statistics of all branches of industry, and direct the information thus obtained to be communicated to this office.

In addition to other useful matter, I have appended to the agricultural report the annual reports of the Liverpool cotton, corn, tobacco, provision, and wool markets, for 1845, together with tables showing the importation, exportation, consumption, and manufacture of cotton in Great Britain for a series of years. The statistical information which the tables furnish will be interesting to one section of the agricultural interest, and useful to the statesman and legislator.

As the Patent Office is now regarded as the general head and representative of the useful arts and the industrial interests of the country, it might be employed in collecting the statistics of all the great branches of national industry—agricultural, manufacturing, commercial, and mining.

Without knowledge of this character a nation knows but little of its capacity, its resources, or its power; nor without it can the legislator perform his duties, in relation to the great interests of his country, with that sound wisdom and judgment which the importance of his position and the consequences of his official action, good or evil, demand.

In almost every other enlightened nation great attention is paid to the procuring of the most copious statistics in relation to all its interests. In this country, it must be confessed, they are comparatively very meagre.

With suitable action on the part of Congress, aided by the co-operation of the several States, this desideratum might be supplied, and the mighty resources of our country become known as they are developed.

In the absence of the action of Congress and the State legislatures upon the subject, it is desirable that voluntary associations of citizens should be formed in the several States and districts of the Union, with a view to the collection of statistical knowledge of all kinds. Much might be gathered in this way, and embodied for public use in the annual reports of this office. Already numerous agricultural societies and clubs have been formed in different portions of the Union, from whose labors and efforts this office has derived much assistance. Their efficiency and usefulness would be increased in proportion to their numbers, and the

judgment and energy with which they should pursue the purposes for which they may be instituted.

The great hall of the Patent Office, known as the national gallery, was designed for the exhibition of works of art, new and curious machines, unpatented as well as patented, and specimens of the manufactured fabrics and articles of this country. At present this design is partially frustrated, by the occupation of the room as a place of deposite for the valuable and interesting specimens of natural history brought home by the exploring expedition.

It is not recommended, nor desired, that those specimens should be removed. On the contrary, it is believed to be best that they should remain in the Patent Office, as they increase the interest of visitors to this noble institution of our government, and extort admiration from those coming from foreign countries. By the latter, the Patent Office, with its rich and varied contents, is justly deemed an honor to the republic.

But, if Congress should deem it expedient to increase the Patent Office building, by erecting one or both of the wings contemplated in the original plan, there would be sufficient room for the exhibition of valuable specimens of manufactured fabrics and mechanical ingenuity. And I cannot doubt that the ample room which would be provided for them would be speedily filled by the choicest specimens of the skill of our ingenious artisans. Such a collection would be as honorable to the nation, as it would be creditable to those who produced them.

All which is respectfully submited.

EDMUND BURKE,
Commissioner of Patents.

Hon. John W. Davis,
Speaker of the House of Representatives.

A.

Statement of receipts for patents, caveats, disclaimers, improvements, and certified copies, in 1845.

Amount received for patents, caveats, disclaimers, and improvements - - - -	$49,700 00	
Amount received for copies - - -	1,376 14	
		$51,076 14
Deduct paid on withdrawals, and money paid in by mistake refunded - - - - - - -		8,223 33
		42,852 81

B.

Statement of expenditures and payments made from the Patent Fund, by the Commissioner of Patents, from January 1 *to December* 31, 1845, *inclusive, under the act of March* 3, 1839.

For salaries - - - - -	$15,545 20	
For temporary clerks - - - -	4,097 09	
For contingent expenses - - - -	8,224 58	
For compensation of district judge - -	100 00	
For the library - - - - -	813 04	
For agricultural statistics - - - -	2,392 41	
		31,172 32
Leaving a net balance to the credit of the Patent Fund of		$11,680 49

C.

Statement of expenditures on the restoration of the Patent Office, under the act of March 3, 1837.

For restoring the records and drawings - - -	$2,938 75
For duplicate models, &c. - - - - -	593 58
	$3,532 33

D.

Statement showing the operations of the Patent Office for the years 1840, 1841, 1842, 1843, 1844, *and* 1845.

Year.	Number of applications.	Number of caveats.	Number of patents issued.	Number of patents expired.	Amount received for patent fees.	Amount received for office copies.	Amount paid on withdrawals.	Ordinary expenses.	Amount paid on restored models and drawings.	Excess of receipts over the ordinary expenditures and withdrawals.	Remarks.
1840	765	228	475	321	$37,575 00	$481 51	$7,173 31	$29,982 45	$7,864 91	$900 75	
1841	847	312	495	327	40,413 01	-	9,093 50	23,065 87	20,507 70	8,253 84	The fees for copies in 1841 are embraced in the amount received for patent fees during that year.
1842	761	291	545	352	35,790 96	714 67	8,068 95	23,154 48	14,060 02	5,292 20	
1843	819	315	531	446	33,913 53	1,402 28	6,026 66	24,750 30	4,586 93	4,588 85	
1844	1,045	380	502	539	41,220 06	1,289 20	10,040 04	26,304 53	2,822 66	6,164 79	
1845	1,246	452	511	470	49,700 00	1,376 12	8,223 33	31,172 32	3,532 33	11,680 49	
Totals	5,483	1,978	3,059	2,455	238,612 56	5,263 78	48,625 79	158,429 95	53,374 55	36,880 92	

NOTE.—The expenditures for the restoration of models, specifications, &c., lost by the fire in December, 1836, are authorized by the 4th section of the act of March 3, 1837, which limits the sum to be expended for that purpose to $100,000. The expenditures, under that provision of the act referred to, are not, therefore, included in the ordinary current expenditures of the office.

E.

Statement of the receipts from patent and other fees, and of the payments for salaries and the contingent expenses of the Patent Office, from its commencement to June 30, 1845.

	Receipts.	PAYMENTS.					Balance to the credit of the patent fund July 1, 1845.
		For salaries and recording patents.	Contingencies, books, fixtures, and repairs, and for statistical information.	Restoring models and records, drawings, &c.	Withdrawing applications for patents, and repayment of money paid by mistake.	Total.	
For patent fees to December 31, 1828, as per statement rendered to the Secretary of the Treasury September 16, 1829	$157,110 00	$62,654 73	*$17,808 10				
For other fees	3,549 37						
In 1829	12,990 00	4,130 55	3,000 00				
In 1830	16,350 00	4,300 00	4,630 42				
In 1831	17,280 00	5,388 85	1,890 00				
In 1832	14,160 00	15,400 00	1,500 00				
In 1833	17,730 00	6,850 02	2,175 00				
In 1834	23,160 00	8,857 03	2,175 00				
In 1835	28,320 00	5,375 13	1,500 00				
To July 4, 1836	17,100 00	2,758 04	2,000 00				
	307,749 37	115,714 35	36,678 52				

* Exclusive of contingent expenses prior to January 1, 1814; the amount of which could not be ascertained, the accounts having been lost when the public buildings were burnt in 1814.

E—Continued.

	Patent fund.	PAYMENTS. For salaries and recording patents.	PAYMENTS. Contingencies, books, fixtures, and repairs, and for statistical information.	PAYMENTS. Restoring models and records, drawings, &c.	PAYMENTS. Withdrawing applications for patents, and repayment of money paid by mistake.	PAYMENTS. Total.	Balance to the credit of the patent fund July 1, 1845.
Amount to July 4, 1836, constituting the patent fund, per act of March 3, 1837	$307,749 37						
Receipts from July 4, to December 31, 1836	14,579 58	$5,300 00	$2,600 00	–	$540 00	$8,440 00	
In 1837	28,901 08	13,400 00	7,500 00	$17,950 00	3,180 00	42,030 00	
In 1838	41,490 45	12,500 00	8,100 00	11,337 00	3,020 00	34,957 00	
In 1839	39,061 95	16,735 00	9,159 22	8,100 00	6,409 99	40,404 21	
In 1840	38,405 39	18,163 51	2,500 00	6,880 00	7,733 31	35,316 82	
In 1841	33,938 76	18,764 82	5,312 38	18,019 59	10,753 33	52,850 12	
In 1842	35,670 96	19,350 00	6,800 00	14,570 00	6,500 00	47,220 00	
To June 30, 1843	16,390 40	9,675 00	3,750 00	3,000 00	3,500 00	19,925 00	
In the year ending June 30, 1844	39,145 19	19,450 00	6,950 00	4,250 00	8,703 28	39,353 28	
In the year ending June 30, 1845	48,472 44	18,824 71	8,297 87	4,680 47	7,995 02	39,798 07	
	643,805 57	152,163 04	60,969 47	88,787 06	58,374 93	360,294 50	$175,511 07

Amount of the patent fund receipts to June 30, 1845, as above stated		$643,805 57
Appropriated out of this fund and paid for the building	$108,000 00	
Total payments for salaries, contingencies, &c., as above	360,294 50	
Balance to the credit of the fund July 1, 1845	175,511 07	
		$643,805 57

TREASURY DEPARTMENT, *Register's Office*, *September* 1, 1845.

R. H. GILLET, *Register*.

E—Continued.

NOTE.—The receipts and payments on account of the Patent Office, from June 30, 1845, to December 31, inclusive, not included in the statement above, have been as follows, viz:

RECEIPTS.

On applications for patents	$26,420 00	
For copies	858 67	
		$27,278 67

PAYMENTS.

For salaries	$8,153 21	
For temporary clerks	2,289 85	
For contingent expenses	4,165 72	
For agricultural statistics	747 55	
For library	686 04	
For records, drawings, and models	257 68	
For withdrawals and money paid as by mistake	4,030 00	
		20,330 05
		6,948 62
Amount of the patent fund unexpended June 30, 1845		175,511 07
Balance to the credit of the patent fund January 1, 1846		182.459 69

F.

Estimate of the expense of constructing the two wings of the Patent Office building, by Robert Mills, Esq.

Sir: Agreeable to your request, I have the honor to make the following statement in relation to the plans submitted for your consideration of the proposed additions to the Patent Office building:

1st. *On the estimates.*—The east and west wings, each 100 feet deep and 70 feet front, made thoroughly fire-proof, and to correspond in their architecture and material with the present building, will cost $150,000

Or the west wing, which has an extra story	$80,000	
The east wing	70,000	
		$150,000

The accommodations provided in the west wing will be—

1. A roomy cellar under the basement story;
2. A large room for a lecture hall, 94 feet long, 64 feet wide, and 15 feet high;
3. A spacious model room above this, or on a level with the portico floor, of the same size;
4. A similar sized room above this, with a gallery running all around the whole height to the roof, which will furnish an uninterrupted surface of wall of equal extent, for the exhibition of paintings, lighted from above.

The east wing will furnish the same accommodations, save the cellar story.

Entrances are provided to each wing from 7th and 9th streets, and stairways to ascend to the upper stories, without having to use the main entrance and stairway.

If an early appropriation could be obtained for the execution of either or both of these wings, one or both could be put under roof before the working season closed.

Respectfully submitted:

ROBERT MILLS, *Architect.*

Hon. Ed. Burke,
Commissioner of Patents.

G.

Report of Charles G. Page, examiner, &c.

Patent Office, *January*, 1846.

Sir: In conformity with your requisition, I have the honor herewith to submit the following notice of inventions patented during the past year.

Since the commencement of the year 1845, the whole number of applications presented to the office is 1,246. Of these, 729 have been apportioned to me for examination; 291 of the 729 have been patented; the remainder have either been rejected or are still pending, waiting final examination. The subjects of applications for patents are comprised under 22 general classes or divisions; each of these comprehending a number of subdivisions, and in some cases more than 20.

Twelve of the above classes are assigned to me for examination, and are as follows, viz:

1st. Agriculture, including instruments and operations.

2d. Chemical processes, manufactures and compounds, including medicines, dying, color making, distilling, soap and candle making, mortars, cement, &c.

3d. Calorific, comprising lamps, fireplaces, stoves, grates, furnaces for heating buildings, cooking apparatus, preparations for fuel, &c.

4th. Mathematical, philosophical, and optical instruments, clocks, chronometers, &c.

5th. Hydraulics and pneumatics, including water-wheels, windmills, and other implements operated on by air or water, or employed in the raising and delivery of fluids.

6th. Lever, screw, and other mechanical powers, as applied to pressing, raising, and moving weights.

7th. Stone and clay manufactures, including machines for pottery, glass making, brick making, dressing and preparing stone, cement, or other building materials.

8th. Leather, including tanning and dressing, manufacture of boots, shoes, saddlery, harness, &c.

9th. Household furniture, machines and implements for domestic purposes, including washing machines and cracker machines, feather dressing, &c.

10th. Arts, (polite) fine and ornamental, including music, painting, sculpture, engraving, books, printing, binding, jewelry, &c.

11th. Surgical and medical instruments, including trusses, dental instruments, bathing apparatus, &c.

12th. Wearing apparel, articles for the toilet, &c., including instruments for manufacturing.

CALORIFIC.

Number of applications, 120.—Number of patents granted, 62.

Considering the large proportions of applications under this head, the novelty of invention presented has been less, perhaps, than of any other class. The subject, one would suppose, has been nearly exhausted; and

it is probable that but few advances of intrinsic value will be made, until some fortunate inventor shall strike out a new path for exploration. The discovery of new sources of heat and light must be made, to give stimulus to inventive effort in behalf of this now overburdened class of inventions. Thus, improvements in lamps were nearly at a stand, until the camphine, or pine-oil, or lard, or some other combustible material, was substituted for oil; and, as each of these sources of light required distinct and peculiar contrivances to render them applicable, so from each was opened up a new track for investigation, experiment, and invention. It is by such process that the field of invention is ever widening, and *will* ever widen till the limits of time shall fix its boundary. Since the establishment of the Patent Office there have been issued 800 patents for stoves, and 130 for improvements in lamps. Doubtless there have not been as many distinct claims to novel inventions, as patents granted; for, prior to the recent organization of the office, patents were frequently granted more than once for the same inventions. But, notwithstanding the swollen list of patented stoves, genius has been fruitfully exercised during the past year upon this useful article, in some cases producing inventions which, from their excessive complication, bore full title to novelty and originality, and, in others, where the novelty was scarcely perceptible at first sight, from the simplicity of the invention, but in which the real merits of economy were conspicuous. To use a paradoxical phrase, it is very easy to invent a stove which will *save all the fuel;* but to combine simplicity of construction, ease of management, and economy of fuel, is no easy task. A stove of this last description has been invented during the last year, in which, by the simple position of what is termed a reverberating plate, much that is desirable has been presented in a single and cheap stove. Much has been done in the line of cooking-stoves and ranges; and all the varieties of cooking may now be performed simultaneously, and with a single fire, and small expenditure of fuel. The question has been raised by some, and not without merit, as to the real economy of protecting an almost endless variety of cooking and other stoves; for the trial of some half dozen, before one can be found suitable for the purpose, and the destruction, in a few years, of the best articles of the kind, (that is, in many cases where the want of provision for the unequal expansion of the plates cracks and spoils the whole fabric in a short time) has led some to the conclusion that the economy of the stove is specious and deceptive, and that the fireplace is, after all, the most profitable in the end. The vast number of rival stoves presented to the public does, indeed, often place one in such a dilemma; but, on the whole, it is desirable at least that those capable of judging in such matters for themselves should have an extensive range for selection.

Under this class has been patented a simple and valuable improvement in the hatter's kettle, which gives a large heating surface to the kettle, prolonging the draught and saving much heat, by making the *smoke-flue* to serve, by a simple contrivance, the purpose also of the *stoke-flue.*

In air-heating stoves, furnaces, and other apparatus for warming buildings, considerable improvement has been made; but, in general, the inventions have not been characterized by much originality of device or principle. In hot-air furnaces for warming dwelling-houses and other buildings, an improvement has been patented which obviates a great inconvenience existing in most fixtures of this kind. The furnaces, to be

kept in order, must be taken down and cleaned once, and frequently twice, every year; which operation, from the great weight of the parts, and difficulty of resetting, is one of great trouble and expense. The flue passages become lined with soot, which not only obstructs the draught, but intercepts the heat. In the improvement spoken of, the flue passages have external openings passing through the walls of the arch or hot-air chamber, and surmounted with a cap or door. By removing these caps the flues are accessible throughout; and thus, if the furnace be properly jointed when first set, there is no necessity of afterwards disturbing the flues.

Lamps.—An invention of some utility, as applied to lamps, has been patented, affording a ready means of controlling the height of the flame without raising or lowering the wick, and giving in fact a greater amount of available light, without increasing the consumption of the oil. It consists in the application of a register-valve to the drip-cup of Argand lamps, more particularly those known as the solar lamp. In most of the lamps of this description, the holes admitting the interior draught, placed usually around the drip-cup, have been made of sufficient size to admit air enough to supply oxygen for the perfect combustion of all the carbon at the ordinary height of the wick. If the draught be lessened by contracting the size of the holes, the effect will be to raise the flame higher above the wick, causing a less perfect combustion of the carbon. But it may be so regulated in this particular that all the carbon may be consumed, though at a considerable height above the wick; and the effect of such extension or dilatation of the flame is to extend the radiating surface, and thus the real luminous effect in an apartment is enhanced, as may be readily proved by the ordinary photometric tests. As the wick is not raised in this case, and the amount of combustion is the same as with a greater draught and lower flame, it follows that the saving is real; and the invention further recommends itself from the facility it affords of regulating the light without the necessity of handling a highly heated part of the lamp.

Considerable progress has been made in the camphine or pine-oil lamps, as regards their cheapness and safety—the highly combustible material being so remote from the burning point as to be kept cool, and thus obviating all danger from explosion, which was of frequent occurrence before the improvement was introduced. The only danger that can now arise from the use of such lamps is from fracture and extensive spilling in contact with flame. This lamp possesses one important advantage, viz: that of giving a white light, more nearly approaching the light of day than that derived from any other lamp. A pale straw color is distinguishable by the camphine light, which is not the case with oil, lard, or gas light. It has its drawbacks in the occasional derangement of the wick or button, by which a copious sooty deposite forms, covering and soiling furniture, dress, &c.; in the unpleasant odor of turpentine pervading the apartment, and the slight chance of danger from fire. It, however, at the present high price of the liquid, is cheaper than oil. It may be well to remark, that the terms camphine and pine oil are synonymous, both preparations being highly rectified oil of turpentine. The introduction of private gas establishments, for the purpose of illumination, has been successfully made during the past year in several parts of our country; and, although careful and extensive experiments in England, made upon this subject, have resulted in placing attempts to substitute oil and resin for coal, in the

production of gas, as one of the follies* of ignorant and hasty speculators, yet the perseverance of humble experimenters in our own country has resulted in the adoption of both these substances, under peculiar circumstances, as economical sources of carburetted hydrogen gas. In the western country, where lard is so abundant and cheap, the refuse fats of the kitchen alone have been found sufficient to supply large establishments with oil gas. One of the peculiarities in the process there adopted is the introduction of a small proportion of atmospheric air along with the gas, which has been secured by letters patent.

One of our light-houses has for some time been lighted by gas from resin, and, I believe, with approbation. The process which has been patented is about to be adopted in one of the largest hotels in this city—the preparations therefor being nearly complete.

In no one branch of domestic economy has greater progress been made than in the construction of lamps, as regards their price. Argand or solar lamps, adapted to the burning of lard or oil, but more especially designed for lard, are now afforded for the very low price of two and a half and three dollars. For this sum a handsome table lamp, with a round glass globular shade, a glass chimney, and one dozen wicks, may be purchased at retail.

The benefits to the public, arising out of the act authorizing the grant of letters patent for designs, have been specially evident in works belonging to the above class. The protection of new and ornamental devices in stove castings has enabled the manufacturer to go to considerable expense in preparing ornamental patterns for his stoves and parlor grates, and the same time to afford them at a very moderate price. The consequence has been that we are supplied with a rich variety of cheap ornamental iron work; and our furnacemen, if they have not already, will soon rival the beautiful Berlin castings.

AGRICULTURE.

Number of applications, 133.—Number of patents granted, 48.

But little novelty has been presented to the office in the way of agricultural implements; and although the subject is one of fast growing interest and value, and has received some rich contributions from chemists and philosophers, yet those branches usually coming before the office have not received as many accessions as in former years. Some improvements have been made in ploughs, particularly wheel ploughs; several new devices have been patented, and one new and apparently valuable invention for adapting the set and draught of the plough in a ready manner, so as to take more or less land, at pleasure.

The *bee hive* has been the subject of much attention; many of the hives presented, exhibiting only changes of form, without the attainment of any new principle in bee management. It is believed that no effectual means have yet been discovered of preventing the ravages of the bee moth, independent of constant personal attention; although several of the inventions patented for this purpose will doubtless, to a considerable ex-

* See Ure's Dictionary of Arts, &c.

tent, diminish the evil. In spite of all the artifices to decoy the moth into traps and to deposite its eggs where the grub will be so remote from the entrance to the hive as to perish in the attempt to reach the comb, this insect retains enough of its instinct to enter as it is wont, with the bee, and deposite its eggs directly in the comb, even in the uppermost part of the hive. As the moth exists only at certain seasons, and does its work only at night, it follows that the entire enclosure of the hive at night will exclude the enemy with certainty. For this purpose the hives are sometimes arranged under a tightly-jointed house, provided with ventilated doors of wire gauze, which are shut regularly at night and opened early in the morning. The objections to this plan are, the expense of the fixture, and the unfailing attention required to open and close the doors; for a single act of neglect in this duty might result in the destruction of the hives. A curious invention has been patented, worthy of mention in this connexion. The patent was granted for combining a hen roost in such manner with the door of the hive that the weight of the fowls going to roost would operate, through the medium of levers and pulley, to close the door of the hive, and the door opened by reverse action in the morning when the fowls leave the roost. If, as the inventor asserts, he can depend upon a certain number of his fowls retiring and rising with the bees, it will prove a valuable labor-saving invention.

HYDRAULICS.

Number of applications, 34.—Number of patents granted, 17.

This class, which has been apportioned to me for examination during only a part of the past year, has embraced a large number of applications, particularly in the subdivision of water-wheels. As usual, they have exhibited much variety, but in which it has been difficult to detect much variety or novelty of principle. Changes and contortions in the forms of the buckets have been the leading features, although several of them have displayed novelty and peculiar fitness for certain situations and kinds of work.

The ancient and too long neglected *water ram* has, during the past year, been revived under new phases, and, it is believed, with good success. The syphon ram has long been known—that is, a ram in which the descent of water in the long leg of the syphon has been made to operate in raising, or rather delivering water above its level. But, so far as known, it has been a philosophical toy, and unavailable for practical purposes. By the intervention of a rarified air chamber, as it is called, in conjunction with the momentum of the descending water in the long leg, the syphon ram has been made an attainment of much practical value, and possesses the advantage of being more simple, cheaper, and less liable to derangement than many of the devices employed to raise water above the level of its source. In this instrument the water employed to operate the ram is the same as that which it delivers above the source; but another patent has been granted for a double ram, in which the force of a running stream or branch water has been employed to raise spring water to any desired height. In this ingenious instrument the two kinds of water commingle to a certain extent, but not in such a manner as to vitiate the spring water in the slightest degree.

STONE AND CLAY, &C.

Number of applications, 16.—Number of patents granted, 9.

Inventive genius has been but little directed to this branch of art in this country for several years past, while it has received much attention abroad.

It has been asserted, in some public journals, that the wonderful and lost process of Sagatto for petrifying animal substances has been rediscovered in this country, and a patent granted. No application has been made to the office for letters patent for such an invention. It is asserted that the process has been a third time discovered in Italy, it having been twice made and perished with the authors.

A patent has been granted for an improved mastic, which cannot be better described than in the words of the patentee: "What I claim for my invention, and desire to secure by letters patent, is, the substitution of red sandstone and clay, reduced to a powder in their natural state, or argil, silex, and the oxide of iron, for the stone of Sessyl or Val du Travers, or other assimilated materials, in combination with the mineral tar of Sessyl, or with any other bitumens used in the formations of mastics."

WEARING APPAREL.

Number of applications, 24.—Number of patents granted, 7.

A large number of applications have been made for patents for systems of cutting garments, and rejected, as not presenting appropriate subjects for letters patent. The mere selection of points of admeasurement, or the multiplication of such points, usually constituting tailors' measures, have not been considered as inventions within the meaning of the law.

An important invention has been made in the manufacture of buttons, which much facilitates the construction, and greatly improves the button for wear and use. The claim of the patentee is sufficiently descriptive of the character of the invention. "What I claim, is my improvement in the modes usually adopted for making the eyelet holes or thread passages of buttons, composed of two circular plates of metal, the one of said pieces being confined to the other, as above described; the said improvement consisting in punching holes through the plates (so as to leave a bur projecting on one side of the plate from each hole) before they are applied and connected to each other, and (in combination with) applying the said holes of one plate to those of the other in such manner that their burred projecting edges may be in direct contact, and the countersunk portion of each of the holes of the plate (there being the same number of holes in each plate) be opposite to that of the corresponding hole of the other plate, thereby forming eyelets or passages countersunk on both sides of the button; by which mode of constructing, the above wear of the threads which secure the buttons, when sewed to the cloth or other material, is, to a very great degree, obviated.

HOUSEHOLD FURNITURE.

Number of applications, 31.—Number of patents granted, 14.

But few improvements of a patentable nature appear to have been made in this branch of domestic economy.

A very simple and useful invention for a revolving pivot chair, or stool, has been patented, which is designed chiefly for the use of schools. It answers also for other purposes, and its construction is of such a character as to render it very economical and durable. In pivot chairs, such as piano stools, &c., hitherto the point of suspension, or centre of motion, has been in the centre of the seat of the chair, and liable to be overturned with the sitter. In the new chair this pivot is eccentric, and is ascertained by observation and calculation with reference to the centre of gravity of the person, securing greater firmness to the sitter.

Castors.—Very many attempts have been made to obviate the difficulties attendant upon the use of castors for furniture, and many of the contrivances have been so complicated and expensive as to preclude their general introduction. The defects are chiefly friction upon the pivot of the castor preventing freedom of motion, a want of strength in the parts sustaining the greatest pressure, and difficulty of repairing when broken. A patent has been re-issued for one of these useful articles, which seems to present all the proper requisites, and great simplicity. It is a simple stout castor, with a long spindle or shank inserted in a deep hole in the leg of the chair or bedstead, without fastening; when the chair or bedstead is raised from the floor, the castor, of course, drops out; but the advantage of this is obvious, when we consider how many injuries have been inflicted both upon the person and furniture where fixed castors have been attached to heavy articles of furniture, such as bedsteads, by leaving the detached parts of the frame to stand upon two castors, the slightest jar being sufficient to throw them down. The hole in the leg of the chair or other article may be bushed with metal, as circumstances may require.

SURGERY.

Number of applications, 40.—Number of patents granted, 19.

The records of the office cannot be taken as a criterion of the progress in this class of inventions, for very many of the most valuable improvements in surgical instruments are of limited use, and are made by those who can afford to give their improvements to the profession for no other compensation than the award of increased reputation. Many unsuccessful applications have been made for patents for medicines professing to be infallible cures for various diseases. Without attempting to discourage the efforts of ingenuity in the healing art, I may be permitted to say that the most rigorous investigation and exercise of your discretionary powers have been directed to the decisions of such applications.

A patent has been granted for a substantial improvement in dental instruments, in which the advantages of the old turnkey have been combined with those of the forceps. In the turnkey, as before constructed, the hook was to be fixed under the tooth by the insertion of the finger, or by some mechanical contrivance of an unmanageable nature. In this instrument the forcep's handles are so combined with the hook of the turnkey as that the opening and closing of the handles controls the movements of the hook, and fixes it at the pleasure of the operator, saving the necessity of introducing the finger in the mouth.

An artificial nipple has been the subject of letters patent. Its construction is novel, and has evidently been the result of close observation upon the philosophy of nursing. Most of the instruments hitherto used for

this purpose have failed, not only from the unfitness of the material used, but from the want of proper attention to their construction. The description of the inventor is as follows: "The artificial nipple, in figure and dimensions, resembles other devices of the kind, being made conical, with the wide end open, the edge being shaped so as to press upon without injuring the breast. The small end is closed, with the exception of a minute perforation in the centre. The material around the perforation projects so as to form a tube of about one-eighth of an inch in length, over which is attached, by ligatures of silver wire, a tube of India rubber, about half an inch in length. This last tube is constructed of a flat piece of India rubber, cut square at one end and conical at the other. It is then perforated through its thickness in the direction of its length, so as to leave a slit on its upper end, and the lower end having an opening large enough to fit upon the projecting part of the nipple."

Another improvement has also been made in the material of this instrument, the nipple being made of the elastic portion of bone, the earthy parts having been removed by chemical process.

Patents have been granted for several species of exercising machinery, designed to furnish invalids, who are confined within doors, with regular and pleasing exercise.

A few patents have been granted for abdomen supporters and trusses for hernia; and although some of the improvements seem to possess intrinsic merit, yet there does not appear to be much that is strikingly novel in this branch.

An improvement has been added to a patent for a galvanic instrument designed to remedy constipation by the stimulating influence of the galvanic fluid upon the rectum. The instrument consists of a tube of silver and zinc, being separated by some non-conducting material. The use of the instrument is affirmed to produce a purgative effect in a gradual manner, but with certainty. The improvement consists in the manner of making and breaking the galvanic circuit with ease and rapidity.

FINE ARTS.

Number of applications, 40.—Number of patents granted, 32.

An ingenious device in machines for ruling paper has been patented by which the ruling may be stopped at any desired distance from the edge of the paper, the edge of the paper itself performing the part of a cam, operating to raise the pens from the paper at any desired point. The thickness of a sheet of paper is a very slight thing to depend upon for operating machinery, but there is no doubt of the successful operation of the invention, as the model furnished the office, though imperfect, demonstrated the fact.

Writing machine.—A very elaborate machine for writing has been patented, evidently the fruits of deep study; and, in view of the complexity of results produced by this contrivance, the construction is exceedingly simple, as well as its operation. The object of the invention is to furnish to those who are unable to write, the means of writing, by sitting before a set of keys, the mere touching of which immediately causes the corresponding letter to be written upon a sheet of paper. A set of cams, one for each letter, are made to operate upon the pen, so that all the rectilinear and curved movements necessary to make the letters are readily and neatly

or tables
nent for
il move-
ion gave
ers with

the year,
ds have
ne object
ion, and

ears past
the past
e desired
descrip-
o imitate
asting as

hout suc-
growing
rity, and
rpose, for
remedied
ble meth-
lapt them
gether by
the types

rovement
facilities,
ith which
type cast-
point of

st year is
producing
definitely.
erest, and
note may
uld this be
be feared
geries will
he amount
s afforded
advantage
she holds
public pro-

ith which

---

en kindly fur-

NORWICH 3. FEBRUARY 1846

GENT.

WE HAVE, AT LENGTH COMPLETED ONE OF THURBERS MECHANICAL CHIROGRAPHERS. ALTHOUGH YOU WILL NOTICE IMPERFECTIONS IN THE FORMATION OF THE LETTERS IN THIS COMMUNICATION, YET THERE IS NOT A SINGLE DEFECT WHICH DOES NOT ADMIT OF AN EASY AND PERFECT REMEDY. I AM PERFECTLY SATISFIED WITH IT BECAUSE I DID NOT LOOK FOR PERFECTION IN THIS FIRST MACHINE. THE DIFFICULTY IN THIS MACHINE IS THAT THE CAMS ARE NOT LARGE ENOUGH. THIS, OF COURSE, CAN BE AVOIDED. I THINK MR. KELLAR TOLD WHEN I LAST SAW HIM THAT IF I WOULD WRITE TO HIM INFORMING HIM WHEN I SHOULD BE IN WASHINGTON HE MIGHT BE ABLE TO MAKE SOME SUGGESTIONS ABOUT A HOME DURING MY STAY IN WASHINGTON. I SHALL WISH TO EXHIBIT THE MACHINE. TO SUCH GENTLEMEN AS MIGHT TAKE INTEREST IN A THING OF THIS KIND. I DO NOT WISH TO MAKE A PUBLIC SHOW OF MYSELF OR MY MACHINE. I WANT TO SHOW IT TO MEN WHO CAN APPRECIATE AND UNDERSTAND MACHINERY. MR. ROCKWELL. OUR REPRESENTATIVE IN CONGRESS. VOLUNTEERED TO GET ME A ROOM & I HAVE WRITTEN TO HIM ON THE SUBJECT. STILL I THOUGHT IN CONSEQUENCE OF YOUR MORE THOROUGH ACQUAINTANCE IN THE CITY THAT YOU MIGHT BE ABLE TO MAKE SOME SUGGESTIONS WHICH MIGHT BE BENEFICIAL TO ME IN EXHIBITING THE MACHINE. I WANT A ROOM LARGE ENOUGH TO RECEIVE SUCH COMPANY AS MAY WISH TO SEE THE MACHINE. I WANT A ROOM WHERE I CAN SAFELY LEAVE IT WHEN I AM ABSENT AND WHERE NO ONE WOULD BE LIABLE TO GO IN AND INJURE IT. EXCUSE THE LIBERTY I HAVE TAKEN, AND BELEVE ME

YOURS, TRULY. CHARLES THURBER.

MESSRS. KELLER & GREENOUGH

PATENT ATTORNIES.

WASHINGTON. D. C.

this pur]
but from
tion of t
dimensic
the wide
juring tl
minute p
projects s
which is
about ha
of India
then perf
leave a sl
enough t
Anothe
ment, the
having b
Patents
designed
and pleas
A few
for herni
trinsic me
in this br
An imp
designed
vanic flui
and zinc,
the instru
ner, but
making ar

Numbe
An inge
by which t
of the pap
operating t
ness of a s
ting mach
invention,
ted the fac
Writing
tented, evi
of results
simple, as
to those wl
set of keys
ponding le
for each let
and curved

produced, and in conjunction with these movements the paper or tables upon which the writing is to be made has a horizontal movement for spacing off the letters, and, at the completion of the line, a vertical movement for spacing the lines. The model accompanying the application gave evidence of the perfection of the invention, as it made several letters with precision and beauty.*

Inkstands.—A variety of inkstands have been patented during the year, and several ingenious, useful, and ornamental kinds of inkstands have come into use, for which we are indebted to foreign countries. The object to be attained in most of them is to protect the ink from evaporation, and at the same time render it easily accessible.

Type casting.—The art of type casting has within a few years past been brought to great perfection; and under a patent granted in the past year, the process has been so expedited as to leave but little to be desired in this branch of art. The inventor states in the preamble of his description that he has endeavored, in the construction of his machine, to imitate as nearly as possible, by mechanical means, the process of type casting as usually performed by hand.

Type setting.—Many attempts have hitherto been made, without success, to print from types arranged upon a cylinder, the failure growing chiefly out of the difficulty of arranging the types with regularity, and retaining them firmly in position. In an invention for this purpose, for which a patent has been granted, the inventor professes to have remedied the above difficulties, and made printing practicable by this desirable method. The types (of uniform size) are of a pyramidal form, to adapt them to their position around the cylinder, and are held firmly together by means of rules or strips of metal fitting into recesses made in the types for this purpose.

Electrotyping types.—A patent has been granted for an improvement in forming types by the electrotype process, which offers some facilities, although it would appear, in view of the rapidity and precision with which type casting is performed, and the recent improvements in stereotype casting, that the electrotyping process cannot compete with them in point of economy.

Anastatic printing.—Among the notable inventions of the last year is one for printing from, or copying, all kinds of printed work, producing perfect fac similies of old works, and multiplying copies indefinitely. Such an invention cannot fail to excite deep and general interest, and even some alarm, when it is announced that an engraved bank note may be copied with perfect fidelity by the anastatic process. Should this be the case, which is somewhat doubtful, there is not so much to be feared in relation to forgeries as may at first sight be anticipated. *Forgeries* will be made in spite of all obstacles, and experience has shown that the amount of crime of this nature does not increase in proportion to facilities afforded by these so basely prostituted discoveries in science. For every advantage borrowed or stolen by the forger from the open hand of science, she holds in her other hand the checks for villainy—the guarantees of public protection.

For written notes and signatures a test paper is offered, with which

* Since the above was written, an entire letter, written by the machine, has been kindly furnished, of which the annexed engraving is a *fac simile.*

neither chemical nor mechanical devices for erasure can tamper. For printed notes, she offers materials which will counteract the attempts to reprint by anastatic or any other process. As such facilities for reproduction and counterfeiting increase, they are met with corresponding increase of vigilance, and the chance of detection is not diminished. The extraordinary art of anastatic printing has been patented in this country to foreigners, and, as far as ascertained, has been practised with success in the city of London. The patent was granted for the process as hereafter given, and not, of course, for the result or principle. The credit of the discovery, and of the first successful production of copies from an engraving or other printed work, belongs to one of our own countrymen, Mr. Joseph Dixon, now of Mystic, Connecticut; and, according to the most creditable testimony, his results are far more perfect than any hitherto attained by others.* Mr. Dixon has been for many years engaged in perfecting his art, and I can testify from personal knowledge of his success in this invention many years ago. But, as the office was not in possession of the details of his process, no reference could be made to him, and the patent was accordingly granted as above stated. It is possible that the two inventors have aimed at similar results by entirely different means; but be that as it may, it is but justice to a real inventor, and the well-earned reputation of our country in the promotion of the useful arts, that this mention should be made, and credit given where credit is so evidently due. The process of anastatic printing is substantially as given in the following description, viz: "We lay the written or printed side on a clean piece of blotting paper, and wet the upper side equally by means of a soft brush, with a mixture of one part of nitric acid of 1.362 specific gravity, and eight parts of water by weight. So soon as the water has completely soaked through the 'orignal,' we lay it between sheets of blotting paper, and remove the excess of dilute acid by gentle pressure, and if the acid has equally penetrated the 'original,' we lay its written surface on the cleaned metallic surface, place double blotting paper over it, and pass it under considerable rolling pressure, which causes the acid to attack the metal where unprotected by the writing, drawing, or printing, &c., on the original, and produce what we call a negative etching.

"Printed books of ten years generally require about 24 hours, and those of thirty to forty years, some days; but, after that age, no material difference appears to have taken place in the chemical condition of the printing ink. When we consider that the originals have been sufficiently acted on by the acid, we remove the cover and add water, so as to reduce the strength of the acid contained in each sheet to such a degree as that it shall not act strongly or disagreeably on the tongue when brought into contact. We now lay the original between sheets of clean blotting paper, and subject them to slight pressure to remove superfluous moisture; we then lay it on the polished metallic surface as before described, and subject it to much greater rolling pressure than recent originals. If saving of time is an object, and when the originals have been very much indurated and dried, as in engravings, &c., we proceed by washing over the back of the original to be transferred with a solution of caustic potash,

* Mr. Dixon's discovery is mentioned in a work entitled "Science applied to Domestic and Mechanic Arts," by Rev. Alonzo Potter, published in 1841; and in the same work is given a specimen of Mr. Dixon's printing. This work was brought to notice after the completion of this report.

impure rain water, or distilled water, of about 1.014 specific gravity, which we prefer to carbonate of potash, as that substance would evolve gas in the next process; and when the original is fully soaked, we prepare a saturated solution of tartaric acid in water, in a shallow flat basin, or on a sheet of glass with a wax border to form tank sides; we then place the original, which has been soaked in caustic potash, in this solution, with the face to be transferred uppermost, and a reaction takes place between the tartaric acid and potash in the paper, forming crystals of cream of tartar, which appear over the whole surface, and are sparingly soluble in water, leaving only those parts which are protected with printing ink uncovered with crystals. We next roll a hard lithographic inking-roller, charged with a small portion of ink, over its wet surface several times, and in several directions, until the black lines become revived by a new coat of ink, leaving the blank part of the paper covered with crystals almost untouched. We next remove the superfluous ink by a second application of a hard roller, uncharged with ink, and dissolve the crystals of cream of tartar by immersing the paper for some hours in dilute nitric acid, twenty parts water by one part acid of 1.362 specific gravity by weight; after which it is partially dried in blotting paper placed on the metallic surface, 'and subjected to slight pressure as before.'

"We remove the 'originals' from the plate after pressure, and wash the plate over in all directions with very thick gum-water, by means of a sponge, and next rub up or fill in the plate with a linen rag or sponge charged with a mixture of lithographic printing ink and gum-water, wherever it has been protected from the action of the acids, which operation of charging the plate constantly follows the continuous washing with gum, as it is usual for lithographic printers to charge their stones; and if the transfer has been not quite complete, or is from old work, this process should be repeated at intervals of one hour or more."

"What we claim is—

"First, the herein described process whereby we transfer by means of treating the 'originals' with acids of strength varying with the induration of the ink, and so pressing out the acid as to cause an etching of the blank spaces, and a reversed impression of the original (where protected from the action of the acid) or metallic surfaces.

"Second, the process of reviving the printing ink on originals, by first acting on them with caustic potash, or its carbonate, and tartaric acid, so as to form cream of tartar in the paper, which prevents the adherence of fresh ink in the blank spaces, while the old ink is left in a state to take up an additional quantity from a roller pressed over it.

"Third, the herein described process of preventing the adhesion of printing ink, during the operation of printing, to any part of the plates, which are required to remain blank, by acting upon such blank surfaces with acid preparations of phosphorus."

Test paper for notes, &c.—The invention patented under this caption, and before alluded to, consists of a colored or test sheet of paper, covered with a white sheet or surface, or a delicate colored sheet on one or both sides. "The object is to protect the test or colored sheet from being tampered with by any chemical agents employed to obliterate writings, and to prevent the using of any sharp instrument or rubbers for scraping or erasing writings, as, should any chemical agent be employed, the test or colored sheet would be so changed as to alter conspicuously the former appear-

ance of the paper, and the white or delicate sheet or sheets, surface or surfaces, would likewise be imbued with a stain or color produced by the action of those chemical agents on, and thence from the color of, the test sheet; the result, therefore, would destroy the appearance of both, videlicet, the outer white or delicate colored sheet or sheets, surface or surfaces, and the test or colored sheet. This being done, it would be impossible to make the said safety and protective paper assume its original appearance, for, if you attempted to whiten or renew the delicate color of the outer sheet or sheets, surface or surfaces, you would thereby completely destroy the appearance of the test or colored sheet; and, if you attempted to color the test sheet, you would likewise produce a darker color on the white or delicate outer sheet or sheets, surface or surfaces. The one is a protection to the other. As to the application of any sharp instrument or rubber, for scraping or erasing writing, being employed, the effect produced would be such that, when applied sufficiently to obliterate either a figure or word, the test or colored sheet would appear conspicuous, and the part disfigured could not be renovated; consequently the obliteration would always be detected."

"What I claim as my invention is the above described improvement, or manufacture, or combination of a colored sheet of test paper, and one or more plain white, or lighter, or darker, or different colored sheets, or surfaces of paper, applied to one or both sides of the test sheet substantially as above specified."

Printers' ink.—An important improvement has been patented for printers' ink, which consists chiefly in mixing coalaphane, one of the products of the destructive distillation of coal, with the materials known as resins, gum resins, or bitumens, and with lampblack, or black in suitable proportions. The advantages claimed are cheapness, durability, and difficulty of erasion. The ink is freed from empyreumatic odor, and, from the specimens of printing presented, must answer well.

Musical instruments.—Since the grant of a patent, in 1844, for what was denominated the Æolian attachment, or the combination of the piano forte and accordeon, genius has been upon the stretch to improve upon this combination; and the piano forte and accordeon, in their separate uses, have been variously modified and improved. Two patents have been granted for modes of tuning the accordeon reeds. The tuning of the reed is a delicate operation, and is effected by filing off an exceeding small portion at a time, until it vibrates to the proper pitch. By the methods now adopted, the tuning is effected by merely increasing or diminishing the length of the spring by means of sliding rests. In one of the inventions, the claim is made to "tuning reeds by means of moveable clamps, which gripe the reeds and embrace a part of the plate to which the reeds are attached, and admit of sliding or moving to increase or decrease the vibrating part of the reed, and thus regulate the tone."

The claim in the other is, to "confining the thin metallic reeds in a sliding plate, and securing the reed and sliding plate in a case, so that the pitch of the reed may be raised or lowered by the turning of a screw attached to the sliding plate."

Piano fortes.—A patent has been granted for attaching a swell to the piano, for the purpose of giving the crescendo and diminuendo tones, and also, in the language of the inventor, to furnish the explosive tones. The sounding part of the instrument is enclosed in a tight case, provided with

shutters, which, by the action of a pedal, are opened gradually to produce the swell, and suddenly to produce the explosive tones.

In the early part of the year a patent was granted for a mode of producing harmonic tones upon the piano by connecting with a pedal an apparatus which made slight pressure upon the middle of the strings, in imitation of the delicate touch of the finger which produces these exquisite tones upon the violin and other stringed instruments, thus producing the harmonic octaves. Pressure upon other nodal points of the strings would of course produce other harmonic tones.

A patent has also been granted for a mode of striking the octaves upon the piano without the necessity of stretching the fingers after the usual mode. The improvement is to produce, by striking upon one key, the effect that usually results from striking it and the eighth or any particular key beyond it, in order that those persons who find it difficult to reach an octave upon the series of keys may easily produce the same result by striking one single key. The inventors give the following description:

"Our invention is not intended to be limited to the striking of octaves, as it will be evident that a piano forte can be readily arranged so that the effects of any two keys of the series may be similarly produced. In order to illustrate the nature of our invention, we will suppose that the first key hammer of the bass operates upon one, two, or more strings, *a a*, in the usual manner. We will further suppose that the strings *b b* are those belonging to the other extremity of the octave, or that they are sounded by means of the hammer of the eighth key on the right of that first mentioned. In order to accomplish this, it is well known the little finger of one hand must be pressed on one key, and the thumb on the other, the operation requiring a considerable and often very inconvenient stretching of the hand; being, besides, attended with other difficulties and dangers well known to pianists.

"In order to effect the two sounds by means of one key, we arrange by the side of the wire or string *a*, and at a little distance from it, another or supplementary string or wire, which is carried out and sustained over a supplementary bridge, arranged and constructed in such manner as to permit the passage and vibration of the string over it without *contact therewith*, the said bridge having suitable contrivances applied to it for the purpose of sustaining the *supplementary string* at the same level with the strings *a a*.

"This supplementary string *is of the same length, or is tuned so as to emit the same sound*, or as near the same as may be desired, as that of the *strings b b*, or at the other extremity of the octave. The hammer is made wide enough to strike at the same time upon the strings *a a* and the supplementary string, so that when its key is struck, a double sound, corresponding with those of the two extremes of the octave, is produced."

"Having thus set forth our invention, we shall claim one or more supplementary strings, damper, and bridge, (or other analogous contrivance for supporting the strings and checking their vibration as above set forth,) in combination with the string *a*, or strings *a a*, of a note, and struck by the same hammer substantially in the manner above specified. We also claim the making the pad of the hammer-head of different degrees of elasticity, or harder in that part of it strictly beneath, and which rests upon the supplementary string, than it is in the part or parts beneath, and

which strike the other strings, *a a*, the same being for the purpose above explained."

Another improvement of a distinct character, but to attain the same end, has been patented; and although it renders the work of the piano somewhat complicated, yet it must afford much facility in many passages. Any number of keys or hammers are connected together by coupling levers; so that the striking of any one key shall, by means of the coupling lever, strike the note of its octave, and the coupling is so arranged that the parts striking the octaves are thrown out of action at pleasure. The inventor does not intend to limit the application of his invention to the production of octaves, but to adapt it to any other series of notes, as taste may require.

A patent has been granted for a mode of making keyed bugles of tortoise shell. In this ingenious and beautiful device the brilliant tone of the bugle is preserved, while the instrument is made extremely light; and from the elasticity of the material, it is not subject to deterioration of tone from indentations. The instrument is made in five parts, which are welded together in an ingenious and perfect manner.

PHILOSOPHICAL INSTRUMENTS.

Number of applications, 15.—Number of patents granted, 6.

Clocks.—A patent has been granted for an improvement in the propelling power of clocks, by which a regular first mover and maintaining power is obtained without the use of a weight or coiled spring and fusee; which improvement is described as follows:

"I make use of a spring, single or with leaves, fastened by its centre to the bottom of the clock case, or in any convenient place. This spring constitutes the first mover and maintaining power. Now if the cord or chain that is usually wound on the barrel be attached directly to the extremity of this spring, it would draw the said cord or chain with more force, and unwind a greater quantity of it from the barrel at one time than another, so that the movement of the clock would never be regular.

"To correct this irregularity of the spring, I have contrived to have the end of the spring applied to a current lever of the second order, to which the cord or chain is connected, which lever is continually increasing in length and power in the same ratio that the force of the spring decreases or becomes weaker as it extends itself; thus maintaining the action of the spring regularly and equally, which is the great desideratum in the construction of clocks with plain springs, instead of the heretofore used cumbersome and expensive weights."

A patent has been granted for an improvement in the balance wheel of clocks, consisting in the "employment of a suspension piece which sustains the lower sides of the arbor, on which the balance wheel is placed in such manner as to take off the weight of the balance wheel and its arbor from the pivots thereof."

An improvement in the chronometer balance has been the subject of letters patent. The balance is made as usual, of two laminæ of different metals, mounted on the staff by the cross arms in the mode usually adopted; but the rim of the balance is made with the arm so placed relatively with the divisions in the rim, that the spaces between the centres of the arm, from the junction with the rim to the extremities formed by each

division in the rim, is as near as possible an arc, forming a quarter of a circle, instead of being, as heretofore made, nearly or quite an entire half circle.

LEATHER.

Number of applications, 30.—Number of patents granted, 21.

But little of intrinsic novelty or merit has been developed under this head. A patent has been granted for a new mode of preparing skins previous to tanning, with a view to hasten the process; the hide is perforated by very fine steel points, either upon the flesh or grained side, the steel points being very close, so as effectually to pierce the hide, and thus facilitate the introduction of the tanning material. The inventor intends to make this perforation by percussion or pressure. The inventor asserts that the puncturing of the leather does not materially affect its strength, nor make it more permeable to water.

CAOUTCHOUC.

Number of applications, 14.—Number of patents granted, 10.

The rapid progress now making in the art of preparing and applying India rubber, the large number of applications made for patents under this head, have rendered it necessary, in the apportionment of subjects for examination, to constitute a distinct class, under the head of caoutchouc.

Some improvement has been made in divesting the rubber fabric of sulphur, but most of the articles exposed for sale have still a strong odor of sulphur, which is extremely tenacious, adhering for a long time to the fingers, after even a slight handling; and, where the articles are worn, the sulphur escaping tarnishes every article of silver carried about the person. The shirred or corrugated India rubber fabrics, of which suspenders are now so extensively made, is an article of much importance, and has been applied to a great variety of useful purposes. In the report of last year a brief description was given of the shirring process. A patent has been granted for an improvement in the shirring process, which will be best understood from the description of the inventor. Shirred or corrugated India rubber fabrics, which consist of strips or threads of India rubber laid between two pieces of cloth of any kind, have been heretofore made by passing the threads or strips of India rubber, in a stretched state and between two pieces of cloth, (which have the surfaces which come together, and embrace the strips of India rubber, prepared with India rubber cement,) between two rollers covered with some elastic substance, to give the requisite pressure, and cause the prepared surfaces of the pieces of cloth to adhere to the strips or threads of India rubber and to each other.

"This mode of operation, although a great and valuable improvement in the arts, makes an imperfect fabric, with the edges of the ribs formed by the strips or threads of India rubber of an irregular form and rugged, and with the surfaces of the two pieces of cloth imperfectly connected between the strips of India rubber. But my improvements remedy these defects; and they consist, first, in making the rollers between which the fabric is formed of metal or other hard substance, with their surfaces grooved in the direction of their periphery, to correspond with the number and size of the India rubber strips and the spaces between them, the strips

passing in the grooves, and the two pieces of cloth being pressed together between them by the ridges, and the grooves being of such depth as to insure sufficient pressure to cause the pieces of cloth to adhere to the strips of India rubber."

"What I claim as my invention, and desire to secure by letters patent, is the method of uniting the various parts in making shirred or corrugated India rubber fabrics, by passing the cloth and strips of India rubber between pressure rollers, one or both of which is grooved to receive the strips of India rubber, and make pressure on the cloth between the strips.

"And I also claim connecting the driving feed roller with the gearing which drives it, by means of a ratchet, to admit of turning it back to stretch the strips of India rubber, when this is combined with pressure rollers, the peripheries of which move with greater velocity than that of the feed rollers."

Cutting India rubber into threads or strips.—This operation, which is one of the most important preparatory to the operation of shirring, has been usually performed by cutting a long sheet of prepared rubber into narrow strips, by means of a series of revolving parallel knives. The cutting cannot be made in a suitable manner unless the knives are constantly wetted by the dripping of water. A patent has been granted for a new mode of cutting by means of a series or gang of knives, having a rapid or vibratory movement, and carried over the sheet of rubber, which is passed over a smooth roller of metal or of wood, the knives being kept continually wet with the dripping of water.

Another improvement in the cutting machines has been patented, presenting a novel feature. In the usual mode of cutting, the knives, which are of thin circular plates, are arranged upon a shaft parallel to each other, having a plate of metal of the desired thickness between them to keep them the proper distance apart, and the whole are tightly screwed up together by a nut at one end.

An important improvement has been made in the machine for cutting India rubber into threads, and secured by letters patent. The cutting knives have usually been screwed up tightly upon the shaft, and their cutting edges thin and sharp. In the improvement mentioned there are two sets of disks, with their edges of the thickness of the strips of India rubber to be cut, and these two sets, revolving in opposite directions, perform the cutting. A peculiarity of this invention consists in not having nuts or disks between the knives to regulate their distances, the disks or knives themselves performing that function; and thus, as the cutting edges of the knives wear away, they accommodate themselves to the proper distances.

Several patents have also been granted for inventions for new fabrics of India rubber. One consists in impregnating the India rubber, or body of the cloth, with emery, sand, or other suitable grit, or with filings of iron, or other metals, or with other hard substances, thereby making a cloth or fabric firm and solid, and suitable for sheathing vessels, for the covering of floors as carpeting, for the soles of shoes, and a variety of other uses.

Another is for imparting additional strength, solidity, and durability to India rubber fabrics, by combining with it the shearings, clippings, or nappings of wool, cotton, silk, hair, fur, or any fibrous substance. The fabrics made in this way are firm, solid, having a smooth surface resembling leather.

Another patent has been granted for combining stocking knit fabric with sheets of India rubber, the rubber being cemented either between two layers of the knit fabric, or in any other way as to form an elastic fabric. There are many other applications of the rubber fabrics, such as to boats, life preservers, &c., which being special in their character, will be considered under their respective classes. Some very beautiful fabrics have been produced in this country by weaving cotton, silk, or other fibrous materials, with threads of India rubber under tension. It is believed that this invention has been really made in this country, by an individual who had no knowledge of what had been done before him, although it had been patented in England several years before.

CHEMISTRY.

Number of applications, 48.—Number of patents granted, 40.

Salt making.—An important improvement has been received by patent in the manufacture of salt, and, judging from the specimen furnished, and its low price, the inventor or discoverer will not be long in reaping his reward. The claim of the inventor will convey the whole idea in an intelligible manner:

"What I claim as my invention, discovery, art, or improvement, and desire to secure by letters patent, is the art or process of separating the impurities contained in salt water or brine, in its crude state, by adding a sufficient quantity of common salt to the salt water taken from the salt springs, wells, or other source, in its crude state, when properly mixed and dissolved, to bring the brine in the vats or cisterns to immediate saturation, for the express purpose of precipitating the impurities and depositing them in the bottom of the vats or cisterns, without the aid of evaporation or of solar or of artificial heat. I do not claim adding salt to salt water for the purpose of concentration, as is frequently done. But I do claim the process above described of separating the impurities from salt water by the addition of salt thereto, allowing the impurities sufficient time to settle, and the drawing off for evaporation."

Filters and refrigerators.—An improvement in this useful combination has been patented, in which the filter is so combined with the refrigerator that the water, when drawn off from the refrigerator, shall be supplied from the filter, and consume no more ice than is required to cool the quantity of water needed for use. The parts are so arranged that the filtering is upwards, and the direction of the water through the filter may be reversed at pleasure, and thus thoroughly cleanse the filtering materials.

A new plan for a refrigerator has been patented, and differs from most refrigerators for keeping meat, &c., in two particulars, viz: the air in the cold apartment is dry, not being in contact with the ice, and the apartment is ventilated by several modes. Usually, in refrigerators, meat and other articles to be preserved become impregnated with mustiness or unpleasant odors, owing to the moisture from the ice and the closeness of the apartment. The ice is placed in an apartment by itself, through which passes a coiled tube communicating with the external air and the apartment in which the provisions are kept. By means of a fan, bellows, or other contrivance for circulating air, the air is driven through the coiled tube, becoming cooled in its passage, and enters the apartment for provisions in a dry state.

A new oil, which the inventors have denominated the *American oil*, has been patented, and from the specimen afforded it must answer the purpose of lubrication in place of the fatty oils. It is obtained by the dry distillation of resin. Oil of a certain character has been before obtained from the destructive distillation of resin, but the inventors claim that they have discovered a new hydro-carbon, not before known to chemists. This interesting class of compounds is frequently receiving new contributions, and as slight changes in the processes, even of temperature, result in new combinations of hydrogen and carbon, the presumption is in favor of the discovery.

Coloring matter from quercitron.—The patentees of this process have, by a slight modification of the process of separating yellow coloring matter from quercitron bark, introduced a substantial improvement. When gelatine is added to a decoction of the bark, the tannin combining with the gelatine leaves the coloring matter precipitated and partly suspended in the liquid. The coloring matter thus separated is impure and deficient in brilliancy. In the improved process the decoction is made and brought to a certain degree of concentration, and allowed to stand for a sufficient time for the coloring matter to subside, when the supernatant liquid is drawn off and the coloring obtained in a clear and bright form. The process has a twofold bearing. The liquid drawn off is used for tanning, and the coloring is fully extracted and of a superior quality.

Coloring matter from spent madder.—A very considerable saving is effected by an invention for obtaining a good available coloring from spent madder. To three pounds of washed spent madder, five gallons of water are added, impregnated with sulphuric acid, so as to raise its strength one degree by the hydrometer. After standing two minutes, the water is drawn off, and five gallons more of water added, with eight ounces of soda dissolved in warm water, for the purpose of neutralizing any remaining acid. In this state it is allowed to stand fifteen minutes. The liquor is then filtered off, and the residue dried in a warm and close room; and when pulverized, it is ready for use as madder is ordinarily used. From the specimens presented to the office, no doubt can be entertained of its value, if the result is certain in all cases, for it makes from that which is ordinarily thrown away an available article.

Concentrated portable jelly.—Letters patent have been secured for a mode of preparing gelatine in such manner that a small portion of it added to hot water, and turned into moulds to cool, affords at once a palatable jelly, with no other labor of preparation. The jelly is brought into a concentrated state by evaporation in vacuo, having previously all the condiments necessary for flavoring mixed with it; it is then packed in bottles and is ready for use; the whole making of the jelly being simply the dissolving a small portion of the concentrated jelly in hot water, and suffering the whole to cool.

Rotting hemp.—This subject has suddenly become one of much speculation and contention among inventors, and it appears that some important improvements have been developed in the preparation of hemp and flax, particularly in the rotting process. In the old process of water rotting, the time required varied from five to fourteen days according to circumstances; in the process of dew rotting, from two to six or eight weeks; and in the process called mixed rotting—that is, commencing the rotting in water and completing in the air—from two to three weeks. Under the recent im-

proved processes, the whole process is completed in a day and a half, or two days at farthest. In the old methods the natural temperature of the air or water was relied upon, and of course the process was more or less rapid as the temperature was higher or lower. In the new mode artificial heat is resorted to. The hemp or flax is put into large vats and steeped in warm water, until it is completely macerated; and as soon as it is brought to this macerated condition, the temperature is suddenly raised to the boiling point, which arrests all further rotting. The critical point in hemp rotting is to check the putrefactive process at the proper time, and where it depends upon the fluctuating temperature of the air, it requires the greatest care and discernment to ascertain when the operation must be checked.

A patent has also been granted for some improvements in the modes of watering, handling, and otherwise managing the hemp.

Hydro-oxygen blowpipe.—An important improvement in the compound blowpipe has been patented, the inventor and patentee being well known in our country as the original inventor of this valuable gift to science and the arts. As the specification of claims by the inventor is somewhat descriptive of the character of the invention, and will be given in your report, the details will not be necessary in this place. By the aid of the recent improvements the metallurgist and artisan are furnished with the means of fusing large quantities of platinum and other refractory substances which refuse to yield to the heat of the most powerful furnaces.

Composition for the bearings of machinery, &c.—Several inventions in years past have been patented for this application, and have been found to answer a good purpose; but the one before us possesses extraordinary merit as to cheapness and durability. A trial has been made of a box for railroad cars, which, after running forty thousand miles, exhibited no perceptible marks of wear or friction. The attention of the government has already been directed to this invention.

Sugar making.—Some valuable improvements have been secured in this extensive business tending to economize fuel in the process of evaporation. In one of them, the evaporating pans, instead of being heated by steam at a distance from the generator, are set directly into the top of the boiler, thus saving much in the construction, and preventing the waste of heat from condensation of the steam. In combination, also, with this device, the boiler is divided into two parts by a partition, in which is placed a controlling valve, by which the temperature can be raised and regulated, as may be required for different stages of the operation.

A patent has been granted to a foreigner, whose name has been favorably known for many years as one of the most successful promoters of the art of sugar making, and is identified with the introduction of one of the most valuable improvements ever made in this connexion, viz: the clarification of sirups and sugars by animal charcoal, and also the restoration of the animal charcoal after it has become *effete*, as it is termed. His present patent is for an improved process of restoring the charcoal, and also for a method of evaporating and condensing by the same apparatus. A series of tubes, conveying steam, are so arranged as to receive the percolating sirup upon their exterior surfaces; and these tubes are connected with the vacuum pans, so that the condensation effected by the evaporation of the sirup is employed to keep up the requisite degree of rarefaction in the vacuum pans.

The past, as well as many former years, has not been without proofs of the inventive powers of the fairer sex. A patent has been granted to a lady for an ingenious device entitled the *submarine telescope*. The instrument has been put to practical tests, and by its aid the exploration of the bottom of a deep river was made in the most satisfactory manner. The instrument is adapted to a variety of purposes, and will not only be useful for many operations of a directly practical nature, but will be of much interest and value to the man of science and naturalist, in acquainting him with the character, mode of growth, &c., of submarine plants, and a thousand other objects now hidden from his vision.

In reviewing the inventions of the past year, the proverbial genius of our countrymen appears to have fully sustained its title, and, did time allow of the comparative estimate, would be clearly shown to have transcended the efforts of other nations, where science can boast of extensive patronage, and real genius rarely escapes the encouragement of wealth. A single allusion may serve to illustrate.. Morse's *electro magnetic telegraph*, one of the most interesting and important inventions of the present day, has, during the past year, been established by the most conclusive practical tests, and, also, by the admission of foreign powers, to be superior in point of economy, facility of transmitting intelligence, and simplicity of construction, to all other known telegraphs. In conclusion, I may remark, that many patents of value, both to the inventors and the public, may have been unnoticed in this brief report, for the want of time, and specially for the reason that the intrinsic worth of inventions and their successful application are not often considered or investigated—the business of examination being chiefly confined to the questions of novelty and patentability. I have therefore endeavored to confine my attention to such of the number as would afford a general idea of the progress made in the several branches of art and science, and of the development of new principles in science and their applications to the arts.

Respectfully submitted.

CHAS. G. PAGE,
Examiner of Patents.

Hon. Edmund Burke,
Commissioner of Patents.

H.

Report of W. P. N. Fitzgerald.

Sir: In compliance with your directions, I submit the following report upon the progress of inventions during the last year, so far as they have come under my observation in the classes committed to my charge. I should follow the example of my predecessor, and extend my report to important inventions made in foreign countries, but my duties have been so heavy and pressing during the year that it has been impossible to give any considerable attention to foreign journals beyond what was requisite in the examination of cases upon which I was called to act.

In the first report made by my predecessor, a historical sketch was given of the progress of the arts from their infancy to the high degree of maturity and perfection which then characterized them; together with a concentrated but comprehensive view of their then present condition throughout the world. This report emanated from one of the master minds in the arts, and it would be a work of supererogation to reoccupy the field so ably explored by him. A glance at that report, and the one which succeeded it, will satisfy you that it is unnecessary for me to extend my remarks to inventions made prior to the commencement of the year which has just terminated.

The classes subject to my examination are—

1st. Metallurgy, and the manufacture of metals.

2d. Manufacture of fibrous and textile fabrics, and all machinery therefor.

3d. Engines operated by steam or other gases.

4th. Navigation, and marine implements.

5th. Civil engineering and architecture.

6th. Land conveyance, including all kinds of vehicles for travel or for transportation.

7th. Mills of all kinds for grinding grain, &c.

8th. Machinery for working lumber.

9th. Fire arms and implements of war.

10th. Miscellaneous.

11th. Hydraulics and pneumatics. This last mentioned class was transferred to me in September, 1845, having previously been examined by my colleague.

Each of the above classes includes a great variety of subjects, differing widely from each other, and requiring numerous subdivisions, which I shall review in their proper order.

Before entering upon this duty, however, justice to inventors and to myself requires me to say, that many important inventions, for which patents have been sought during the past year, will necessarily be overlooked, from the fact that, although more examinations have been made than at any other equal period in the history of this office, there are still nearly one hundred applications in my desk upon which I have not been able to bestow a passing glance.

And although there may be inventions among them which will mark eras in the progress of those branches of the arts to which they belong, they must, for the present, be passed over in silence, and made the subject of a future report.

METALLURGY AND THE MANUFACTURE OF METALS.

But little has been developed during the past year, before this office, connected with the art of separating the metals from those impurities with which they are mingled or combined in the mine.

Gold.—This metal, which is found merely *mixed* with impurities, may be separated by means wholly mechanical, the heat and chemical agents necessary in purifying the baser metals neither being necessary nor applicable. The improved process of washing, noticed in the last report of my predecessor, is the last improvement which has come under my observation, whose object was to separate gold from its impurities.

The attention of metallurgists is still principally directed to the manufacture of iron, which, from its vast and increasing importance, and the numerous practical difficulties attendant upon its manufacture, still presents many problems for the scientific and practical iron-master to solve. The substances with which iron is combined in the various kinds of ore—those used for effecting their decomposition and separation—their proportions and affinities, are, in general, ascertained with comparative ease; but the intensity of the heat, the regulation of the quantity of decomposing matter, the mode of exposing the ores, the manner of directing the current of burning gases, or other ignited matter, upon the mass, the form of the furnace, &c., require such nicety of practical adjustment and adaptation, and are so easily deranged, that the best process which science could suggest might, in consequence of a slight practical defect, prove utterly unsuccessful. The ease with which the iron combines with the materials used in decomposing the ores also presents a serious obstacle in the way of obtaining it in its purity. The substitution of one material for another in the process, which is composed of similar elements, will frequently produce very important changes in the result; and it would be extremely difficult for the mineralogist and chemist in many cases to give a sound reason for the failure of the one process while the other is crowned with success. Patents, therefore, for apparently very inconsiderable changes in the process or materials used in reducing ores, when there are improvements in results, should be readily granted.

Patents have been granted within a few years, both in this country and in Europe, for modes of obtaining pure malleable iron directly from the ores. It is doubtless true that experiments of this kind have sometimes been attended with success; and at other times, following apparently the same process, they have failed. The processes heretofore patented, although they may possess great merit, do not appear to have been characterized by that uniformity of result which is so essential in any branch of manufactures, and which alone commands public confidence and patronage. They have not all of them, however, been fully tried, and perhaps will yet produce, under skilful management, practical results of a highly satisfactory character. One patent for an invention of this kind has been granted, in this country, to a foreigner within the last year, and the process is as follows, in his own language:

"By my process, I am enabled, in a very short space of time, to manufacture wrought or malleable iron from the richer kinds of ore, such as the hematitic, and others, which contain not less than forty-five *per cent.* of metal, and which generally contain a considerably larger quantity; my

process not being considered as adapted to the earthy ores, or to any of those which contain a less per centage of iron.

"Before proceeding to give the particulars of my process, I will remark that the invention herein described is the result of a series of experiments, by which I have ascertained that the attempts heretofore made for converting the richer iron ores into malleable iron, by means of carbonaceous matters in reverberatory furnaces, have failed principally from a want of knowledge of the effect of carbonaceous substances, when so employed, as regards quantity; the proportion added to the ore having been much too small to answer any good purpose, as it was not capable of de-oxydizing any considerable portion of the ore, and the means attempted were not such as would particularly prevent such small quantities from being again oxydized by the working of the reverberatory furnace. Although I do not claim, therefore, to be the first who has made the attempt to manufacture malleable iron from the ore in a reverberatory furnace, I do claim to be the first to have discovered the cause of former failures, and to have devised the means of rendering the process successful.

"In reducing the kinds of ore referred to, which consist principally of the protoxides and peroxides of iron, I have discovered that not less than from twenty to forty per cent. of carbon, by weight, and in many cases more, should be mixed with the ore when it is to be reduced in a reverberatory furnace; and I exclude from the list of those which are to be so treated all such as do not contain a sufficient quantity of oxygen to require the lesser proportional quantity of carbon above named. It will be seen, therefore, that my process applies to that class of ores which, under the ordinary mode of treatment, are deemed refractory, these being the most available when subjected to the process invented by me. With the several ores that I employ, the actual quantity of carbon, or of carbonaceous matter required, will vary considerably, although it will always be equal in amount to that above stated; and I will hereinafter give such information as will enable the workman to judge readily when he is using the proper relative quantity for the iron ore upon which he is operating.

"I commence my process by taking any of the rich iron ores, including under this denomination those only which will yield forty-five per cent. and upwards of that metal, either as they are obtained from the mine, or as they exist after the carbonic acid, or other volatile matter which they may contain, has been separated from them by being calcined or roasted, and which, when so operated upon, will contain that per centage or more of iron by analysis. By means of millstones, rollers, or any other suitable apparatus, I crush or pulverize the ore, which I am about to reduce into particles, sufficiently small to pass through a riddle or screen, the meshes of which measure from one-fourth to one-eighth of an inch, preferring the smaller size. To one hundred parts of the ore, or calcined iron stone, so reduced in size, I add from twenty to forty parts, and frequently more, of carbonaceous matter, such as coke, charcoal, peat, or anthracite, which has been in like manner reduced to powder and passed through a sieve, or screen, of the smaller size mentioned; and, after well mixing them together, I pass a charge thereof, usually of about five hundred pounds weight, into a puddling or reverberatory furnace, which may be of the ordinary construction, and heated in such manner as to be in a state suitable for receiving pig iron to be puddled. This mixture should be occasionally but moderately stirred up—say every five or ten minutes; and,

after some time, dependant upon the heat of the furnace, as well as upon the particular ore under treatment, it will become pasty under ordinary circumstances; this takes place in about half an hour, the pastiness resulting from the hotter parts having become metallic, and adhering or welding together; the furnace is then to be brought to its greatest heat, and the charge balled; but the iron must be previously kept as "*open*" as possible, and care must be taken that it be not balled up too soon, otherwise it will be tender, and most probably *red short*. In about an hour and a half or two hours from the time of charging, if the furnace be properly constructed, the fuel good, and well managed, the charge will be ready for the hammer, and may be treated as puddled iron made on the customary plan.

"It will be obvious, from the remarks already made, that the definite quantity of charcoal or other carbonaceous matter cannot be prescribed, without taking into account the exact quantity of oxygen contained in the ore or calcined iron stone, and of the quantity of carbon, or of carburretted hydrogen, supplied by the carbonaceous matter employed; but, from my experience, I would recommend, as an approximate rule, that where a hundred parts of the ore under treatment contain about fifty of metallic iron, about thirty parts of charcoal, or its equivalent in other carbonaceous matter, be added thereto, and for every additional two parts of iron in one hundred of the ore I would add one part of carbonaceous matter.

"I have sometimes combined with my process of reducing the ores of iron in the puddling furnace the additional operation of bringing pig plate, or other cast iron, into the state of malleable or wrought iron, by adding portions of such cast iron to the mass which is being acted upon. This pig or cast iron, which is a carburet of that metal, not only assists in the reduction of the oxide of iron still remaining in the ore, but has its own carbon separated by the oxygen of the ore. I prefer to add the cast iron when the charge of ore begins to feel heavy or pasty.

"When the cast iron is thoroughly melted, and well incorporated with the ore, the action of each material on the other so rapidly quickens the process, that some difficulty is experienced in preventing its being balled too soon; but, as before stated, the mass should be kept "*open*" at a high degree of heat. Thus not only does the addition of cast iron increase the production of malleable metal, with a given cost of time and and labor, but it also, from causes scientifically accounted for, operates as a desirable adjunct in facilitating the process.

"I do not name the relative proportions of ore and of cast iron, nor do I limit myself to the time of adding them together, as these conditions may be varied at the will and according to the experience of the operator; but it is best to use a smaller proportion of cast iron when a very pure ore is being acted upon, or the quality of the wrought iron may be injured in some slight degree.

"The workman will, after a little experience, be able to determine whether the requisite proportionate quantity of carbonaceous matter has been added to the particular species of ore under treatment, by paying attention to the following particulars:

"First, if, in the working of a particular description of ore, the return of iron be deficient in yield with reference to its known contents by analysis—say less than from two-thirds to three-fourths thereof—and that a larger proportion of slag or cinder runs from it than might be expected,

and if all appearance of the presence of carbonaceous matter vanishes at at an early stage of the process, there is manifestly a deficiency of carbon, and it must be increased in working the subsequent charges.

"Secondly, if the return be good, but the metal does not ball up readily, or stand the hammer well, and if a considerable portion of the carbonaceous matter be seen floating on the molten cinder at the close of the operation, there is too much carbon in the mixture, and in future charges its quantity must be reduced.

"Thirdly, if the cinder be moderate in quantity, if the iron ball up readily, if the carbonaceous matter disappear about thé time of balling up, and the bloom stand the hammer well, the proportions may then be deemed correct."

This process has also been patented in England. Its usefulness can be determined by experience only. It is useless to theorize upon it.

It is confidently asserted that one of our own countrymen has invented an apparatus and process by which the pure malleable metal is obtained directly from the ore, in a perfectly satisfactory manner, and with uniform results, and that the invention has been fully tested. If such be the case, I shall be able in my next report to give you a full account of the invention and its practical operation; but, at present, it would, for many reasons, be premature.

Some of the most important improvements which have been made within the last few years in the manufacture of iron are, the introduction of the hot-air blast, the saving of the combustible gases, which had formerly escaped through the chimney, returning them for use, and in changing the fuel, prior to use, into combustible gases, which are afterwards used in an ignited state with atmospheric air, to produce the heat required for the operation. The general principles having been promulgated, and their efficacy fully established by experience, inventors have since been occupied in discovering new modes and varieties of application. Within the last year, letters patent have been granted for a mode of applying the hot blast to bloomeries, which appears to be of sufficient importance to insert. The following is the language of the inventor:

"In the manner of arranging the pipes for obtaining the hot blast, as herein represented and described, I do not claim that there is anything new or of my invention, I having in this particular adopted a system of pipes for heating the air first used in England, and known under the name of Nelson's pipes for the hot blast. My improvement consists simply in the manner in which I have combined these pipes with the bloomery forge-fire or chimney. I am fully aware that there is not any novelty in the mere application of the hot blast to the bloomery forge, this having been carried into operation in a great variety of ways; but I have, as I verily believe, so combined the hot-blast pipes with said forge-fire, as to obviate the several objections which have, in practice, been found to interfere with those erected prior to my carrying my plan into operation. In most instances the air has been heated in an arch erected at the tunnel-head of a furnace, within which head-pipes have been arranged in a manner substantially the same with that herein described; but in this case, as well as under some other arrangements, besides the necessity of erecting an expensive arch of fire-brick, the plan itself has not answered the purpose intended; the particles of ore and of cinder which have been prevented from escaping have been found to fill up the openings in the arch,

to obstruct the draught, and to adhere to the pipes in such quantity as in a short time to prevent the air that passes through them from being duly heated, in a few days' use only, as I have repeatedly experienced; they are thus rendered incapable of heating the air to such a degree as to produce any useful effects.

"In my plan, it will be seen that the heating pipes are in close proximity with the bloomery fire, and that I dispense entirely with the arch, while I give to my chimney such a form as to produce all its anticipated benefits, without its cost or inconveniences.

"Having thus fully described the nature of my improvement in the manner of applying the hot blast to the bloomery fire-forge, I do hereby declare that I do not make any claim to the applying of the hot blast thereto; nor do I make any claim to the form or combination of the pipes for heating the air, this being the same with numerous others which have been long known and used; but what I do claim as of my invention, and desire to secure by letters patent, is the manner in which I have combined said pipes with the bloomery forge-fire, by placing them within the chimney, immediately over said fire; which chimney is formed in the manner herein described and represented, so as to effect the desired object, without the use of an arch or any analogous structure. To this particular combination and arrangement I limit my claim."

Two patents have been granted within the past year for the generation of the above mentioned combustible gases, and their application to the manufacture of iron. Both are reissues of patents granted and noticed previously, and it is therefore unnecessary to dwell upon them in this place.

No patent has been granted in this country during the last year for improvements in the manufacture of steel.

In concluding my remarks upon this branch of the subject, it is proper to add that the inexhaustible supply and variety of iron ores in this country, and of the materials used in reducing them, and manufacturing the various kinds of iron and steel, and the extensive demand for these indispensable products, render it a matter of the utmost importance to us, as a nation, that the processes connected with this branch of the arts should reach a degree of perfection which they have not hitherto attained in this country; and the ingenuity and enterprise of our manufacturers furnish the best guarantee that we shall not be long in attaining that eminence in this branch of manufactures which appears to be our natural right.

MANUFACTURES OF METALS AFTER THEY ARE SEPARATED FROM THE ORES, AND THE MACHINES USED THEREIN.

Forges.—But little evidence of improvement in the blacksmith forge has come before this office during the past year, but one patent having been granted within that time. Blacksmiths have heretofore found considerable inconvenience to arise from the extinction of their forge fires, in the ordinary course of their work, which is such as to leave the fires unused occasionally for intervals of time. The fire during this time becomes extinct, and time and fuel are consumed in rekindling. To obviate this difficulty, and to render the forge portable, the patentee has provided it with pannels, which slide in grooves in the cover and bottom of the forge,

in such a manner as entirely to surround the fire, leaving a small opening at the bottom for a moderate supply of air to it, and another at the top to perform the ordinary office of a chimney.

Several applications have been made for alleged improvements in tuyeres for conducting the blast to the forge fire; but none of them have presented the requisite novelty to secure letters patent, and are therefore rejected or returned to the applicants for amendment.

One patent was granted early in the last year for improvements in trip-hammers for working large masses of metal; but as I find it described in the last report of my predecessor, it is unnecessary that it should be here described. It is stated by my predecessor, however, that it avoids a practical inconvenience in the steam-hammer, previously patented, to wit: the inconvenience arising from the upsetting of the piston-rod. It is but justice to the first patentee to state that, in making this objection, my predecessor overlooked the fact that the piston-rod was united to the hammer by a spring attachment, to prevent upsetting. The difficulty in practice had, therefore, already been foreseen, and the appropriate remedy applied. If this circumstance had been noticed, the remarks above alluded to would have been withheld, as the gentleman who made them would have been the last to prejudice the rights of an inventor.

Butt-hinges.—Only one patent has been granted during the year for butt-hinge machinery, and that was a reissue of an old patent for making the joints, &c. of wrought iron hinges by the use of appropriate cutters and dies. The patent is too well known to require description. Two patents have been granted for improvements in window-blind hinges.

Pins.—But one patent has been granted within the year for the manufacture of pins, and that to a foreigner. It is proper to remark that the pin machinery of this country is far superior to any other in the world. The machinery patented, however, has its important characteristics, and will be understood by reference to the claims which I give, as follows:

"Having now described the construction of the improved machinery to be employed in the manufacture of nails, rivets, screws, and pins, I desire it to be understood that I claim, in reference to the heading of metal rods or wire for the above purposes, the means of effecting what I call a 'double upset,' viz: by crushing the end of the rod or wire for forming the boss or head of the nail, rivet, screw, or pin, by two or more operations of a single heading-punch and pair or set of holding dies, and the sliding guides, the whole in combination as above described, the rod or wire being brought forward between the holding dies a short distance by the sliding guides, after the first or partial crushing of the metal, to complete and perfect the form of the boss or head, when the second pressure of the punch is brought up against it. As respects the pointing of pins, and discharging them from the machine, I claim my improvement therein—the same consisting in imparting to the sliding-bar (I) certain alternating lateral and back movements in its bearings, as described, whereby the pins are turned in opposite directions during the action of the mill-roller upon them, and discharged from the machine when the pointing of them has been completed."

File-cutting.—This operation has in general been performed by hand, when the best article was required. As it is almost impossible to find a blank of the same degree of hardness throughout, the blow upon the chisel should vary in force, not only according to the *width* of the blank

to be cut, but also according to its varying hardness. Both of these requisites can easily be attended to by a skilful operative; but as these varieties of hardness occur irregularly, no machine has yet been invented which can perfectly adapt itself to them.

One file-cutting machine has been patented within the last year, in which the file blank is placed upon a carriage under the chisel, so that the edge of the chisel shall make the desired angle with the blank, the parts being adjustable in this particular. The hammer which operates upon the chisel works like an ordinary adjustable tilt-hammer. The force of the blow is regulated by a spring, the power of which is again regulated by the width of that part of the file upon which the chisel is operating; and thus, if the blank be of nearly equal hardness throughout, as it moves onward by the regulated intermittent motion of the carriage, it will be properly cut.

Spikes, nails, and rivets.—But two machines of this class have been patented during the year. Very excellent machines have been in use for several years, and secured by patents, and very little progress has since been made. The more recent machines may operate well, but exert no important influence upon this branch of manufactures.

Wood screws.—Two screw machines have been patented, and, although improvements, they operate upon the same general principles with some of those which were previously in use.

Locks and fastenings.—Some ten patents have been granted for machines belonging to this class during the year, and, although several of them are useful, no one seems to possess that distinctive character or commanding importance which entitles it to notice above the rest. They are all modifications of locks, latches, &c., previously in use.

Lead pipe.—For several years past valuable machines have been in use in this country, and a vast amount of pipe has been manufactured. The machines in use give satisfaction, and the improvements made in this branch of manufactures have reference to minor details, while the general characteristics of the machine are preserved. Two patents have been granted the past year for such improvements. In one of the machines patented the cylinder from which the lead is forced through the matrix or former is substantially a double-acting force pump, and is connected with an air chamber for the purpose of preserving a regular stream. This cylinder is located partly within the heater and partly within the furnace. By this construction the operation of forming the pipe can be continued any length of time—the cold lead being regularly supplied to the heater, and one end of the cylinder being filled by suction, (pressure,) while the lead is forced from the other into the air chamber, and thence continuously through the apparatus for forming and cooling the pipe. The other patent is for tinning the interior of the pipe, which is effected by forcing the melted tin, during the formation of the pipe, into a tube in the core, and thence discharging it, through numerous small openings on all sides of the mandril, upon the interior of the pipe.

Tools.—Several inventions of machines under this title have been patented during the year: such as the blacksmith's vice, hammers, augers, saw-filers, drills, &c.; but there is but one which it is necessary to describe. Letters patent have been granted within the year for a machine for boring the cylinders of rotary steam engines, and for other similar purposes, which deserves notice. The operative part of the machine is at-

tached to the end of an arm, which is attached to, and revolves with, a shaft, which is placed in the position which the shaft of the rotary engine is intended to occupy. The cutter is attached to a small shaft which revolves in the outer end of this arm, and is perpendicular to the arm and to the main shaft. It will readily be perceived, that with this arrangement, when the cutter is properly set and the solid ring of metal is placed around the main shaft and properly adjusted, the revolution of the main shaft—the ring being immovable—will cause the cutter to cut a slight groove in the rim. The shaft of the cutter is then geared by cog-wheels, &c., to an immovable cog-wheel, surrounding the main shaft in such a manner that the cutter shaft will revolve very slowly as the main shaft revolves, and thus the width of the groove at first cut is increased by degrees until the boring is completed. It will be evident that the groove bored in this manner will every where, when cut by a plane passing through the axis of the main shaft, present a portion of a perfect circle of an uniform radius.

Other patents have been granted within the year for inventions more or less meritorious belonging to the class of metallurgy and the manufactures of metals, but to notice them all particularly would be to extend this part of my report beyond its appropriate limits.

MANUFACTURE OF FIBROUS AND TEXTILE FABRICS.

This class, for the variety and complexity of machinery which it presents, is perhaps unequalled by any other; and although it has exercised the powers of the most inventive minds for ages, and comprehends machinery producing results which are almost incredible, still every year furnishes valuable contributions to its already munificent stores. It is not to be supposed that every branch of this comprehensive class has equally advanced; but while some have remained nearly stationary, others have made steady progress. The subdivisions of this class will appear as I proceed to notice them.

Preparation of fibres.—Cleaning and carding wool.—There have been but three or four patents granted within the last year in this division; one for carding, and the others for cleaning and burring. Although the machines patented possess novelty and merit, they do not so materially differ from machinery previously used as to render a particular description of them necessary. No patent has been issued for wool combing.

Cotton gins.—Several patents have been granted for cleaning cotton, and one for ginning the long staples. This cotton gin is an improvement upon that variety which is known as the "roller gin." So far as I am acquainted with the machines heretofore in use for that purpose, they have produced to some extent an injurious influence upon the cotton, in consequence of the pressure, rubbing, and strain upon the fibres, made by the rollers; the cotton thus becomes "dead," as it is termed, and can be easily distinguished from that which is picked by hand; while the machine patented is said to produce an article *equal* to that picked by hand. The cotton is carried from the hopper, by a toothed cylinder, to a large cylinder with fan beaters or ribs, which is covered by a cylindrical case that opens on the side opposite to the feeder into a funnel-shaped box, whose bottom inclines downwards. The large ribbed cylinder, as it revolves, takes the cotton from the feeder and throws or blows it down to the lower

end of the box, where there is an opening to two grooved ginning rollers, to which the cotton has easy access. These rollers, as they revolve, are prevented from separating by a weighted lever resting upon an adjusting screw. The ends of the rollers are made for a short distance smooth, and of the slightest increase of diameter, which keeps the grooved portion of the rollers separate from each other, but not so far as to prevent their drawing the cotton between them. The pressure of the weighted lever does not come upon the cotton unless the supply is too large, and in that case it operates to regulate the supply. Thus the injury arising from pressure, straining, &c., is avoided. A little above and in front of the upper ginning roller, and a little below and in front of the lower one, there is placed a fluted roller, working very near to the ginning rollers, and in opposite directions, (at the points where they meet,) which strip the ginning rollers of the long fibres which would otherwise wind around them. The operations of this machine are said to be entirely satisfactory; and if so, an important step has been taken in this branch of manufacture.

Preparing the fibres of hemp and flax.—Inventive genius is still industriously exercised upon machinery for separating the fibres of hemp and flax from their woody connexions, and preparing them for manufacture. Many applications have been rejected for want of novelty, and seven or eight machines have been patented. These patents have generally been granted for slight modifications of pre-existing machinery, still operating upon principles well known. One of the patents I will, however, notice, as it seems to present a feature distinguishing it radically from the rest. The breaking of flax or hemp has heretofore been effected by a series of permanent blades, variously arranged, with movable blades arranged in a manner to correspond, and working between them, or by its being carried between fluted rollers, &c., &c. While the hemp is unbroken the stalk is of such a form, and the fibre adheres to the woody part in such a manner, that if the stalk be broken abruptly, without previous preparation, or if rubbed violently by any machinery used in breaking, more or less of the fibres will be broken or injured. The machinery heretofore in use, and above alluded to, has generally been of a character thus to injure the fabric, though the defect in some is vastly less than in others. To remove this imperfection in pre-existing machinery, the patentee above alluded to first receives the hemp, &c., from the feeding apron between two smooth rollers, which flatten it and slightly disengage the fibres from the woody part, and afterwards feed it to a double series of *small smooth* rollers, the upper series working opposite the spaces between the lower ones, the rollers of each series being placed so as nearly to touch each other, and the upper series being pressed down upon the lower by weights, &c. The surfaces of all these rollers move with a speed equal to that of the flattening and feeding rollers, and in the same direction, so that the hemp is carried through these series of rollers, and is successively bent in a short curve upwards and downwards, without the slightest tension, rubbing, or injurious breaking, until the fibres are entirely loosened from the woody part, which can then be shaken or beaten out in any convenient manner. The patentee unites the above described machine with other parts for cleaning, which I do not deem it important to describe.

Some of the other machines patented during the year approximate the same point which seems to have been attained by the inventor whose machine I have described.

Spinning.—Cotton, prior to being spun, is formed into roving, which is sometimes deposited in cans, from which it is withdrawn to receive the necessary additional twist. The ordinary mode of depositing the coils in the can is around its inner sides, leaving a considerable space in the middle, thus limiting the quantity it will contain, and leaving the coils in danger of falling in such a manner as to become entangled with each other and break. To remedy these inconveniences a machine has been invented by a foreigner, for which letters patent have been granted within the year. In this machine the guide for the roving, together with the drawing rollers, revolve upon a shaft which is eccentric to the can to such a degree that as the guide and drawing rollers revolve in one direction, and the can in the opposite direction, with different velocities, the roving is deposited in coils or loops which extend from the centre of the can to the sides in all parts of it. Thus the can is filled, the roving well supported, and in condition to be easily withdrawn without breaking.

Several patents have been granted for improved machinery for spinning. In one of those machines the bobbins of the whole spinning frame are supported by their lower and inner edges, upon the outer edge of a large horizontal wheel, from which they derive their motion.

At high speeds the "live spindle" has been found to vibrate to such a degree as to break the thread so often that it has been necessary to drive it at a speed much less than is desirable. This inconvenience was, to a considerable degree, obviated by supporting the spindle in a tube extending up from the traverse rail, which very much diminished its vibrations; still, however, it was found necessary to limit its speed. Letters patent have, within the year, been granted for extending the tube both above and below the traverse rail, by which improvement it is found that the spindle can safely revolve at a much higher speed than before.

Two or three years since, letters patent were granted for supporting the bobbins in the spinning frame by the edge of the belt which gave them their motion. This mode of supporting them is said to be defective, inasmuch as the bobbin frequently flies up from the belt; and, when that is the case, it fails to receive the necessary rotary motion. Letters patent, within this year, have been granted for an improvement intended to remedy this defect. For this purpose the lower end of the bobbin is extended down a little farther than the width of the flat belt which is used. Around this lower part of the bobbin a groove is cut of proper width to receive the belt loosely, and of sufficient depth to prevent pressure upon the bobbin by the belt. This groove receiving the belt, if the bobbin rises or flies up, the lower flange of its groove will touch the belt and receive the proper rotary motion from it.

The foregoing are nearly all the patents connected with the subject of spinning which have been granted during the year.

Weaving.—Nine or ten patents have been granted during the year for improvements in various parts of the loom; but such machinery is generally of a character so complicated that it would be impossible to give an idea of improvements made upon it, without elaborate drawings and descriptions. In one of the looms patented the improvement consists in attaching to the loom a simple apparatus which, in ordinary weaving, will answer as a substitute for the Jacquard. Its merit consists partly in the ease with which it can be attached to hand looms already constructed,

which have no machinery for raising the figure. In many cases it may be very useful.

In weaving by power, where the shuttle is thrown with great force and is arrested by the picker in the opposite box, the steel point of the shuttle sometimes penetrates the picker, and adheres to it in such a manner as seriously to interfere with the movements of the shuttle box. In one of the looms patented this inconvenience is obviated by placing on the picker cam a slight protuberance which shall operate upon the treadle, at the moment the shuttle is at rest, in such a manner as to move the shuttle forward far enough to clear the picker; and before changing the box, the treadle is relieved, and the picker falls into its usual resting place, so that neither shuttle nor picker will interfere with the operations of the box.

In weaving Brussels carpets, and other figured fabrics of a similar texture, some parts of the warp are occasionally worked into the fabric with much greater rapidity than others, while the tension on all should be the same. This circumstance renders it necessary to provide a means of producing the proper tension upon the threads, and to provide also for regulating the delivery of the yarn as it may be required. The yarn, instead of being rolled upon a yarn beam, as in the case of ordinary weaving, is placed upon bobbins which can deliver independently of each other. Letters patent have been granted within the last year for a mode of accomplishing the objects above mentioned, which will be understood from the following description, which is nearly in the words of the inventor:

"The nature of my invention consists in suspending a weight on the yarn forward of the spool or bobbin, which is so arranged as to unwind the yarn at intervals, as the slack is taken up by means of a catch which holds the bobbin from turning till lifted by a weight.

"The spools are arranged in a frame in the usual way, and just in front of each spool two wires are fixed in the frame; the catch is formed of wire, the ends of which are attached to a thin plate, the position of which is over the wires above named, and extending from end to end of the spool. The wire curves downward at each end of the spool to a point just behind it, where it is coiled round a pin forming the fulcrum for it in the frame; from thence it is bent upward and crosses over behind and parallel with the spool, and resting against it; from the rim of the spool project one or more pins that strike against the wire; this prevents the spool from turning to unwind the yarn. The yarn runs from the spool forward over the wire, nearest to the spool, and thence it passes down to the weight that is suspended by it, and from that over the other wire to the shed; by this, it will be obvious that as the slack yarn is taken up the weight will be raised, and when the yarn is let off from the spool it will fall, and all the time continue to keep the yarn stretched with an equal tension. The weight consists of a ball or other shaped poise, from which a rod projects; about the middle of the length of this rod is a flattened enlargement, through which there is a hole, and from this a slot is cut diagonally downwards, thus forming a hook by which the weight is hung on to the yarn, and leaving a portion of the rod to project above it. When the slack of the yarn is used up, as above named, and the weight is raised, the upper end of the rod passes up between the wires, strikes against the plate above, and raises it; this relieves the pin on the spool from the catch, and allows the spool to turn which lets off yarn, and

causes the weight to descend; the catch, being again brought into contact with the spool, stops its revolution as it comes round.

"It will be obvious that the arrangement of the bobbins in the frame or creel can be varied, as well as that of the catches; for instance, placing them endways towards the loom, or vertical, and so adapting the catches or weights as to act in that position without changing the general principle.

"What I claim as my invention, and desire to secure by letters patent, is the combination of the weight and catch with the bobbin or spool, constructed and arranged in the manner and for the purpose substantially as herein set forth; so that when the weight is drawn up, it will relieve the catch, and allow the spool to unwind and the weight to fall."

Felting.—One patent has been granted this year for felting cloth. The process and machinery used are but slight modifications of those well known.

Cotton batting.—Within a few years this article has become an important and extensive branch of American manufactures, and has recently drawn to itself the attention of inventors to such a degree that four applications have recently been passed for improvements in its manufacture. The bat of the required length and thickness being formed, by any convenient process, it becomes necessary to cover it with a thin coat of size; after which the fabric is dried. The extreme delicacy of the bat, and the very slight adhesion of the fibres to each other, render the process of sizing and drying one of considerable difficulty. The improvements made by three of the patentees I will give you in the words of the inventors, as extracts from the patents will present them clearly and concisely. The earliest of the four patented improvements will be understood by a perusal of the following extract taken from one of the other patents:

"The nature of my invention consists in arranging the sizing rollers immediately above an aperture in the top of a drying chamber, provided with a stove and hot-air tubes on each side to dry the batting as it descends, a grating on each side to protect it from contact with the tubes and stoves, and a folding box at the bottom, into which the batting is folded from one side to the other, as it descends. By this arrangement, I dispense with the endless belts heretofore employed in sizing and drying batting, which are soon destroyed by the great heat to which they are exposed in passing through the drying chamber, and which are, of course, very expensive; and, at the same time, I avoid the contact of the batting after it has been sized and before being dried. I am aware that it has been essayed to dispense with the endless belts by passing the sheets of batting from the sizing rollers over another roller, then down into the drying chamber, down near to the bottom of the chamber, and then up again to another roller at the top, the chamber being provided with a stove on each side, and a hot-air tube between the descending and ascending portions of the sheet of batting; but I consider this objectionable, for the reasons that the sizing vats and rollers are so situated that the sized bat has to pass over a roller before entering the drying chamber, and because, as it is carried down and then up again, in case of breaking it is liable to fall on to the bottom stove, and catch and communicate fire to the whole establishment; and in the event of not catching fire, it becomes necessary for the operative to enter the hot-air chamber, which is heated to a very high tem-

perature, to replace the batting in a condition to continue the operation up; all of which difficulties are obviated by the location of the sizing rollers immediately over the aperture in the top of the furnace, in combination with the arrangement of stoves and pipes, and protecting grates on each side, and the folding box at the bottom."

"I do not claim as my invention conducting the bat from the sizing rollers to the dying chambers without a belt; but what I do claim as my invention, and desire to secure by letters patent, is the arrangement of the vatch of the sizing rollers immediately over the aperture in the top of the drying chamber, in combination with the arrangement of stoves and pipes and protecting grates on each side of the chambers, and the folding box at the bottom, for the purpose and in the manner described."

The following is the third mode above alluded to, and is extracted in the words of the inventor:

"The methods heretofore practised of making the bat of the desired thickness for wadding are, to deliver the broad sliver or sheet of cotton from one carding engine into an apron, which moves back and forth until a sufficient number of layers have been obtained; or so to construct the engine as to deliver a single sliver, or sheet of the required thickness, or to carry up the slivers from the carding engines vertically, so arranged as to unite them all into one bat. The defects of these methods are obvious; for, with the first, the sheet of wadding must either be made very short, or be spliced end to end, (a very imperfect operation;) with the second the reciprocating apron, on which it is delivered, must be of an enormous length, occupying an amount of room too great for the convenience of an establishment; and with the third, the slivers, which are drawn up over head, frequently break. The arrangement of belts must necessarily be very complex; and from their situation, the slivers are much exposed to fire; and, indeed, from the number of accidents which have occurred, none of the establishments which manufacture cotton wadding can be insured. The object of the first part of my invention is to avoid these objections and inconveniences; and it consists in ranging a series of carding engines, one behind another, over an apron which has a continuous movement, so that the sliver or sheet of cotton from the second card is delivered on top of that from the first, the one from the third on to that of the second, and so on to the end of the series, the number of carding engines being in proportion to the quality and thickness of the bat or wadding desired; it being a fact well known to those versed in the art of working fibrous materials, that the thinner each sliver the more perfect will be the bat; and it will be evident that, with my method, this can be refined to any desired extent.

"As to the glazing operation, but one method has been practised, (although several have been proposed and patented,) which consists in conducting the bat on an endless apron to a vat, where it is glazed on one side, and then conducted to a second vat to be glazed on the other side, and from this delivered on to another endless apron, which passes through a kiln or hot-air chamber to be dried. This method is not only very imperfect, but attended with great expense and danger, for that face of the bat which rests on the apron is not exposed to the direct action of the heated air, and therefore dries slowly; which fact renders it necessary to raise the temperature of the kiln and hot-air chamber, which very soon destroys the apron, and often subjects the whole establishment to loss by fire.

The second part of my invention, it is believed, obviates all these objections, and consists in passing the glazed bat or wadding from the glazing apparatus through the kiln or hot-air chamber over a series of open reels, arranged side by side on one plane, and extending from end to end of the kiln, one reel delivering the bat on to another, and so on to the last in the series, where it is delivered out. If the bat is glazed on both sides before it is introduced into the kiln, but one set of reels is used; but I prefer to glaze it first on one side, dry this by passing it through the kiln on one set of reels, and deliver it at the other end to the second glazing apparatus, to be glazed on the other side, and then passed through the kiln on another set of reels above the first. In this way I avoid the inconvenience of accumulating the glazing or sizing on the rods of the reel, for, in passing through the first time, the unglazed surface rests on the bars of the reel, and the second time the side first glazed; in this way I avoid what otherwise would be a serious inconvenience."

"It will be obvious that the first of my invention is applicable to various operations in the manufacture of fibrous and textile substances, such as making bats of wool, and other animal fibres for felting, and all other operations in which it is necessary to form a bat of several thicknesses of sliver, of the width of the doffer of a carding engine; and it will be equally obvious that the second part of my invention is also applicable to all operations in manufactures which require fragile webs or tissues to be conducted from sizing or glazing apparatus, to be exposed to the action of heat or currents of air."

The following is the last process for glazing cotton batting which has come to my notice, and is in the words of the inventor:

"Pelisse or cotton wadding, which consists of delicate fibres of cotton connected together and made into a bat by the operation of the carding engine, has heretofore been glazed on the two surfaces by passing first one and then the other surface in contact with rollers or belts covered with the glazing matter, as it was supposed that this could only be effected by moving the surface of the bat in contact with a glazed surface. This necessarily requires two operations to glaze the two surfaces, and leaves the edges only partially covered or glazed, and consequently ragged and liable to fray out.

"My improved process avoids all these difficulties, and renders the operation much more rapid. It consists in passing the batting or bat into and through the glazing matter, and at a velocity so great as to simply cover the entire surface, including the edges, and prevent the glazing matter from penetrating to the inner fibres.

"The manner in which I have applied my improved process is simply to pass the batting, at a velocity of about thirty-six feet per minute, into and through the glazing matter, and under a roller near the bottom of the vat, and thence out, so that the batting shall pass through the glazing matter in passing to and from the roller.

"I wish it to be distinctly understood that I do not lay claim to this apparatus as it has been employed for saturating with tar, and other similar substances, batting made of hempen and other coarse fibres, employed in sheathing vessels, &c., the object being thoroughly to saturate the fibres to cause them to adhere to each other and to the cementing matter, with the view to form, as near as practicable, a water-proof fabric, the object and the fabric being entirely different from cotton or pelisse wadding; but

what I do claim as my invention in the process of glazing the fabric known under the general appellation of pelisse or cotton wadding is passing it through the glazing liquid at a velocity substantially such as herein described, so as to cover the entire surface and edges without penetrating to the inner fibres, as described."

Here I must close my remarks upon fibrous and textile fabrics. Neither the time nor space properly at my command will justify a more extended view of the subject. Enough has been said to show clearly that this important class of manufactures is still progressing in a manner highly creditable to the industry, enterprise, and inventive genius of this country.

STEAM AND OTHER GAS ENGINES.

This class includes not only steam engines properly so called, but the heating apparatus by which the steam or gas is generated for their propulsion, and the apparatus by which the steam is condensed. Sixteen patents have been granted within the year for improvements belonging to this class; some of which are, in my opinion, very important.

Steam generators.—Letters patent have been granted within the year for an improved boiler, adapted more particularly to the western waters, to obviate the difficulties arising from the deposite of sediment in various parts of the boiler. The fire chamber is placed at the side of the boiler. The boiler is composed of vertical tubes, surrounded by a large vertical cylinder, into the upper and lower parts of which they open directly. The bottom of this large cylinder is made dishing, and has a mud valve at the centre. The heat is first applied at the upper parts of the tubes, and afterwards carried around to the lower part of them, but not to the bottom of the boiler. The water enters a water jacket surrounding the fire chamber and the tubular part of the boiler, and as it is comparatively cool when it enters, it will sink down and enter the tubes at the bottom, to supply the evaporation which takes place at their upper ends. The current of fresh water, therefore, tends constantly to wash the sediment downwards towards the mud valve, while the evaporation is going on above. The value of this invention can be ascertained by experiment only.

Several modes of supplying water to boilers have been patented; and one very ingenious method I should be glad to notice, but I cannot give an intelligible description of it without drawings.

Four patents have been granted for safety-apparatus for steam boilers during the year. Three of them open a safety-valve by applications of the well known fact that different metals expand in different degrees by the application of the same amount of heat. As they present no strongly marked novelty, my limits will not allow me to give them further notice.

The fourth patent above referred to is for a magnetic gauge to indicate the height of water in the boilers. The construction and operation of this instrument are very simple, and will be fully understood, both in character and importance, from the following preamble in the words of the inventor:

"The importance of a reliable means of indicating the height of water in steam boilers is now universally admitted by engineers, for the reason indicated by science and established by experience, that the deficiency of water in boilers is the principal if not the only source of explosions; and hence the many attempts which have been made to obtain an apparatus

for this purpose, which, whilst it can be relied on, will at the same time be in such a condition as to insure the observance of the engineer. But, so far as I have been informed, all the attempts heretofore made have failed, because of the difficulty of forming the connexion between the water inside the boiler and an indicator, which, to be practically available to the engineer, must be outside. A float resting on the water, and communicating with an index, a lever, or other device outside, through a stuffing box, has generally been resorted to, but it is evident that the friction of the stuffing box will prevent the working of such an apparatus, which must be sensitive, and which necessarily possesses very little power, as the buoyancy of the float is its only actuating force. To avoid this difficulty, attempts have been made to put the indicator within the boiler by covering it with glass, but with as little success, for the action of high temperatures, it is known, renders the glass opaque.

"My invention, it is believed, will avoid all these difficulties; and it consists simply in attaching a magnet to the axis of motion of a wheel or lever, to which the float is suspended or attached, to communicate motion, by attraction and repulsion, to an index needle turning on an axis outside the boiler, and separated from the magnet by a steam-tight plate."

An important improvement has been patented within the year, in the mode of coupling or connecting two cranks, which are to operate in concert, and constitute what is known as the "bell crank" used on the main or other shaft of the steam engine and elsewhere. It will be readily perceived that any irregularity or inequality in the action of the cranks, which would in the slightest degree change the relative positions of the two, would produce a strain upon them, and the pin connecting them, which would soon cause one or the other to break, or would otherwise embarrass the action of the machinery. To obviate these evils the patentee has invented a new mode of coupling the cranks. The description cannot be fully understood without drawings; but the general principle may be understood from the claim, which is as follows:

"It will be obvious that the effect may be produced on the same principle by connecting the pin to one crank by a turning joint only, and in the other by a turning and sliding joint; and that the construction of the parts, and the manner of making these joints, may be varied without affecting in any manner the principle or character of my invention, although I have described that mode of construction which I deem to be the most effective, and best adapted to the end in view.

"What I claim as my invention, and desire to secure by letters patent, is connecting a crank pin with two cranks by means of turning and sliding joints combined, whether the pin be made to slide in both cranks or only in one, so as to equalize the strain of the engine on each crank, and allow them to move and compensate for any error in the relative position of the crank shafts, as herein described."

A valuable improvement has been patented, within the year, in the mode of connecting the cylinders of steam engines with the steam boxes. The "nozzle," which always causes a waste of steam, has heretofore been considered indispensable; but, by a judicious arrangement, the patentee has dispensed with it, and in other particulars has rather improved than impaired the connexion of the steam box with the cylinder. His invention will be understood by reference to the following extracts from his patent:

"In forming the connexion of a steam cylinder with the steam chest of puppet valve engines, it has long been known to engineers that the closeness of this connexion is important in an economical point of view, not only on account of the weight and cost of materials employed in making a long connexion, but because all the steam contained in this connexion is condensed or otherwise lost at each stroke of the engine, and hence various devices have been resorted to by engineers to surmount this difficulty. The steam chest has been variously arranged and located, but still all these devices have presented a large area between the chest and the cylinder; for, the steam chest being cast separate from the cylinder, sufficient room must be left to form the connexion by bolted flanches, which necessarily occupy much room.

"To remedy these evils is the object of my invention, the nature of which consists in casting the steam chests in one piece with the steam cylinder, or one with the cylinder, and the other with the condenser and the cylinder bottom, by making the side of the cylinder the side of the steam chest, and so of the condenser, and also in so forming and adapting the appendages of these parts as to enable them to come together and to unite the cylinder head with the cylinder, and the cylinder bottom with the cylinder within the narrow compass left between the steam chest and cylinder, when they are brought in such close proximity; the flanche on the cylinder and cylinder bottom being dispensed with towards the steam chest, and, instead thereof, a joint made between the chest and cylinder by packing or driving, and screws inserted from the inside of the steam chest and screwing into the solid metal of the cylinder; for the lower steam chest and for the upper end recesses being made in the side of the steam chest, to admit the requisite screw bolts for securing the cylinder head.

"I do not claim letters patent simply for casting the steam chests with the cylinder, or with the cylinder bottom and condenser; but what I do claim as my invention, and desire to secure by letters patent, is casting the steam chests with the cylinder, and the other with the cylinder bottom and condenser, by making the side of the steam chest the side of the cylinder or condenser, in combination with the manner of fitting the cylinder head and the lower end of the cylinder to the chests, and the mode of making the attachments without the continuation of the flanches, thus dispensing with the nozzle and nozzle flanches, and their attachments, and saving at each stroke the steam contained in the nozzels, all as herein described."

The mode heretofore adopted of tripping the drop cut-off valve, was, in practice, found to be imperfect, as, at certain points of the stroke, it could not be operated with certainty, and much injury would result from failure. Letters patent have been granted, within the year, to the original inventor of this cut-off, for an improvement which removes the practical imperfections of the old apparatus. The evil which existed, and the remedy, will be understood by reference to the following extracts from the new patent:

"By the method now practised of operating the drop cut-off valve, the motion is derived from the lifter, which approaches its state of rest as the piston of the engine approaches the middle of its stroke, or its maximum velocity; and the valve is tripped by the same motion which lifts it, so that there must be very great nicety in the adjustment to regulate the extent of the cut-off at about the half-stroke. The object of my invention

is to remedy this, and its principle or character consists in tripping the valve by a motion independent of the motion of the lifting rod or rods; and, also, in combining the various parts in such manner as to regulate the cut-off with accuracy during the action of the engine, by connecting the two shafts that trip the two cut off valves, end to end, by means of adjustable spring arms that take into, and are, when set, held in the teeth of a sector, which vibrates on the axis of motion of the shafts, and receives its vibratory motion from the eccentric; which spring arms may be shifted in the teeth of the sector, brought nearer to, or farther from, each other, and thus cut off at a less or greater portion of the stroke.

"It will be evident, from the foregoing, that any motion derived from any part of the engine may be substituted for the vibration of the arms or wipers, provided the character above described be maintained; as, for instance, instead of the horizontal vibrating motion of the arm or wiper, the spring may be disengaged from the stem of the valve, by a vertical descending motion, as the lifter rises; and this may be derived from any moving shaft, such as the piston rod, the beam, the crank shaft, &c.

"What I claim as my invention, and desire to secure by letters patent, is tripping the drop-valve of the cut-off by a motion independent of the lifters, substantially in the manner and for the purpose herein described.

"I also claim combining the wiper that drops the valve of the cut off, whether working horizontally or vertically, with any of the moving parts of the engine, other than the lifters or their rocking shaft, by means of the sector and arm or arms, by means of which the extent of the cut off can be regulated at pleasure during the action of the engine, from the full to the least portion of the stroke, as herein described."

The great advantages which result from working steam expansively have given rise not only to cutting off the steam at any desired point of the stroke, which is the object of the drop and many other valves, but also to the use of two cylinders; in the first of which the steam is admitted and operates in the usual way, and at the return stroke the steam at the exhaust end of the cylinder is admitted into the other cylinder, which is auxiliary to the first and of greater diameter, in which it operates expansively. Several modifications of this variety of engine have been from time to time invented in this country and in Europe, but they have not been extensively used. One of the most serious objections to them has always arisen from the fact, that while the steam was operating advantageously in the auxiliary cylinder, it was re-acting against and resisting the motion of the piston in the primary cylinder. This objection seems to have been entirely removed by a new arrangement of parts, for which letters patent have been granted within the past year, and of which the following is a general outline.

The two cylinders have the same length and diameter and are placed side by side with valves at each end, opening directly from one to the adjacent end of the other. The connecting rods of their pistons are jointed to cranks on the main shaft which are at right angles to each other, so that when one piston has completed its stroke the other is at half stroke. Suppose, then, the piston of the main cylinder to be nearly at the bottom or starting point; the steam is admitted in any convenient way to the main cylinder, and its piston moves until it has made its half stroke, at which time the piston of the auxiliary cylinder is at the bottom. The valve between the two cylinders behind the main piston is then

opened, and the steam expands into the auxiliary cylinder and operates behind both pistons until the first has made its full stroke and the second is at half stroke. The valve between the cylinders is then closed and the eduction valve of the main cylinder is opened, and the induction valve is opened at the other side of the main piston; at the same time the pipe to the condenser is momentarily closed, and the exhaust steam, lifting a hinged valve, rushes into the heater. The pipe to the condenser is immediately opened, and the remainder of the steam in the main cylinder is condensed in the usual way, and the main piston begins to return. In the mean time the steam which was left in the auxiliary cylinder is operating expansively upon the second piston, which it continues to do until it has completed its stroke, and the steam is then exhausted in the usual way, when the valve between the cylinders at the other end is opened, and the same operations are repeated during the return stroke which took place during the first. By this arrangement it is readily seen that the reaction above alluded to is entirely avoided, and that when the first crank is at its dead point the second is perpendicular to the second piston. Letters patent have recently been granted in England for an engine very similar to that above described.

Patents have been granted this year for modifications of cut-off valves, which it is unnecessary to describe.

The vibrating engine, for driving spiral propellers, patented in 1844 and noticed in the last report of my predecessor, is said to have presented practical objections, and letters patent have been granted within the last year for modifications, by which, it is said, they are removed. The improvement is certainly ingenious, and will be fully tested.

Important improvements in the rotary engine have been made and patented during this year. The usefulness of this variety of engine has been seriously circumscribed by mechanical obstacles in the way of its construction, which seemed to be incident to its nature; and among which the great extent of packed and ground surfaces was not the least. For many purposes the rotary engine is very important, and substantial improvements upon it have long been demanded. Such, in my judgment, is the character of those last patented. It is impossible, without drawings, to give a clear idea of the invention alluded to, but the following extract from the patent will sufficiently set forth its general characteristics:

"The characteristics of this engine, and what distinguishes it from all others before known, are, first, making the annular chamber in which the piston works (technically termed the "cylinder,") in two parts, united at a line passing through the centre of the annular chamber, and parallel with the axis of the shaft, instead of uniting the two valves at a line at right angles to the axis; by which arrangement I am enabled to make the cylinder true, less liable to unequal expansion, avoiding the necessity of a continuous packed or ground joint entirely around the chamber or cylinder, and presenting the important advantages of greater solidity and simplicity, the lower half being permanently fixed in the frame which supports the bearings of the shaft, &c., by flanches which admit the induction and eduction valves; thus greatly reducing the number of packed or ground joints, so objectionable in all steam engines, particularly the rotary engines.

"This arrangement not only adds greatly to the strength of the whole structure, but enables me to bore out the cylinder by an instrument, which,

during the operation, has its bearings in the boxes intended for the shaft of the piston, to insure accuracy in all the parts.

"Secondly, in so arranging the steam and exhaust valves, and the steam passages in the disk to which the piston is attached, as to avoid the pressure of steam on the valves when moving; and connecting these with a shifting valve which governs the apertures in the disk and the one on the hollow shaft, through which the steam is admitted, and an annular groove in one of the packing plates that covers the disk, so as to afford an easy and simple mode of reversing the action of the engine.

"Thirdly, in grooving the faces of the disk and of the packing plates or cheeks between which it works from the outer periphery inward, to admit steam to lubricate the rubbing surfaces.

"Fourthly, making the outward and rubbing surface of the piston of a single spring-metal hoop, divided at its junction with the disk, so that by means of hempen or other packing within and a packing head, the diameter of this ring can be enlarged and diminished at pleasure to fit the cylinder, by which means the numerous joints found in metal pistons heretofore used, and which are so objectionable, are avoided.

"And, lastly, connecting the piston to a flanche projecting from a disk on the shaft, by means of screws, passing through enlarged apertures in the disk, to admit of the free play of the piston, to adapt itself to the cylinder in case of any inaccuracy."

In closing my remarks upon this class of inventions, I deem it proper to express the opinion, that, during the six years of my connexion with this office, no one year has been signalized by so many truly valuable inventions connected with the steam engine as the last.

NAVIGATION AND MARINE IMPLEMENTS.

But few inventions have been presented to this office, during the year, upon the subject of ship or boat building. One invention, relating to the movable keels of vessels, has been patented. The bulk-head, in an important part of the hold, which is necessary for the reception of the slip or sliding keel, causes much inconvenience in lading, and considerably diminishes the capacity of the vessel. To obviate these inconveniences, the patentee places the movable keel in the proper position upon the outside of the vessel, where it is retained by bolts passing down into it, through the pillars which support the middle of the thwarts, and through the bottom. Chains also pass in like manner, to the top of the keel, to draw it up and hold it tight against the bottom of the vessel, and which have sufficient length to allow the keel to be drawn up the side of the vessel and out of the water. Other chains are attached to the keel, which pass up by the side of the vessel, for drawing it up out of the water, when, by the withdrawal of bolts and loosening of the other chains, the keel is unshipped. I make no remark upon the probable usefulness of this invention, but shall leave it to practical men.

One patent has been granted for an improvement in the construction of iron boats, which is worthy of attention, and which will be understood from the following extract taken from the patent:

"My invention consists in forming the sheets of metal with mouldings or beads, in suitable places to take up the surplus metal, when said plates are pressed into form, by means of projections on the die and correspond-

ing depressions on the matrix or concave mould, which gather up the metal and prevent wrinkles around between the upper and lower parts of the boat, so as to present a smooth surface, and also in forming a recess or bed for the gunwale, which holds it in place, and prevents its getting knocked down. I also add a flanche around the stem and stern posts, and along the line of the keel which takes up the surplus metal there, and forms the keel and stem and stern posts."

One patent has been granted for improvements in sails, by which, it is said, cotton canvass can be successfully substituted for that which is in common use.

A truss has long since been used to sustain the yards of vessels, but when applied to any of the lower masts, it becomes necessary to unship the yard before the mast immediately above it can be lowered. To remedy this inconvenience, a truss has been invented and patented within the year, so constructed that the upper mast can be lowered directly through the truss, without disturbing either truss or yard.

The injurious effects of the booms and gafts of mainsails, foresails, &c., upon masts, have induced ship builders to resort to various expedients for avoiding them. Friction rollers, slides, &c., have been placed in the jaws of the boom or gaft. Slides have been used with some success; but when applied to the boom jaws, the slides, by resting upon and striking against the saddle, soon become bruised and broken in such a manner as to injure rather than protect the mast. Letters patent have been recently granted for a means of avoiding this difficulty, which consists in so constructing and supporting the saddle, that a space is left between it and the mast for the reception of the slides, while the boom rests upon the saddle in the usual way.

Letters patent have been granted, within the year, for a cable spring, to be used when ships are riding at anchor. Its object is to prevent the violent and injurious jerks and strains which are caused by the motion of the vessel. The machine consists of a long wedge, placed between two rollers in a frame firmly fixed. The rollers are pressed together by powerful springs, for the purpose of resisting the passage of the wedge between them. The cable is then attached to the wedge, sufficient slack being left between the wedge and the capstan, and when any strain comes upon the cable the wedge is drawn in between the rollers as the springs yield, and is forced back by them when the strain is removed. By this device allowance can be made, by a comparatively small contraction of the springs, for a very considerable motion of the vessel.

Propellers.—Applications for letters patent for improvements in propellers have been very numerous during the year, but most of the alleged inventions which have been presented were old, and of course rejected; and, with few exceptions, those which have been patented possess very little novelty or usefulness. The applications have extended to almost every class of propellers, but principally to that variety known as the "*screw*" propeller. As they present no striking features to distinguish them from others which are well known, it is unnecessary to go into a detailed description of them.

The spiral propeller, although among the best submerged propellers now in use, is subject to a very serious objection; an objection which cannot be removed, as the defect is incident to, and inseparable from, the very nature of the propeller. And it is this: when the propeller revolves,

only a portion of the force, which it derives from the engine, is exerted to propel the vessel, the remainder being lost in lateral pressures, which produce no beneficial effect; and, indeed, it is well if they do no harm. It will be readily perceived that, if the floats were at all points parallel to the shaft, the whole force would be exhausted in lateral pressures, and no part of it would be exerted to propel. If, then, the floats are placed in a position slightly angular to the line of the shaft, a slight propulsive force would be produced, but a diminished lateral force would still be exerted; and, as the angle of the float increases, the relative proportions of these forces will vary until the floats become perpendicular to the line of the shaft, when no power, propulsive or lateral, is exerted. It is only in positions between these extremes, and partaking more or less of both, that propulsive power is attainable, and in such positions the lateral force is also exerted and lost. By the well known mode of resolving forces, the force exerted by each float may be decomposed into two—one in the direction of the shaft, and the other perpendicular to it; the former, alone, would exert a beneficial influence, and the latter would be lost. If the angle of the float is such as to produce very little lateral pressure, an impracticable velocity of the propeller would be required to produce a reasonable degree of speed in the vessel, so that no position of the floats will answer a practical purpose which does not waste a great part of the power in lateral pressures. However the floats may be formed, this objection will still, in one way or another, cling to them. And, as economy of power is of the utmost importance, particularly in sea-going vessels, where the submerged propeller is especially necessary, it is highly important that a propeller should be introduced whose action is direct, and which is not incumbered with those practical inconveniences which have impaired the usefulness of most of those which have hitherto been essayed.

CIVIL ENGINEERING AND ARCHITECTURE.

No improvements in architecture have been brought to my notice, in the discharge of my duties, during the past year, except in the minor branches, such as improvements in the mode of constructing and hanging doors, windows, &c., and preventing the entrance of water under them during storms. As these improvements are mere modifications of the modes heretofore in use, and well known, it is not important that I should describe them.

Civil engineering.—A very considerable number of patents have been granted in this class during the year; and while some branches of it have advanced less than during the preceding year, others have made greater progress.

Hydraulic foundations.—The screw-pile invented and patented some years since in Europe, but which until recently has not been extensively used, the inventor has caused to be patented in this country. Its usefulness for hydraulic foundations and moorings has come to be understood in Europe, and it will probably soon be equally well appreciated in this country.

Letters patent have also been granted for an improvement in hydraulic foundations of an entirely different character. It is well adapted to sandy bottoms, and calculated to obviate the great evils consequent upon the washing away of the sand, and thus undermining the pier upon which

the wharf or other superstructure rests. From the following, nearly in the words of the patentee, the invention will be understood:

"To construct a circular foundation.—A platform of temporary piling is first erected upon the site for the convenience of the workmen. An iron pile, (wrought) of suitable length and diameter, and armed with one of Mitchell's patent screws at its lower extremity, is inserted into the ground or bottom, at a point occupying the exact centre of the intended structure. This forms the guide-pile, to regulate the placing of all the other parts of the structure. A series of similar wrought-iron screw-piles are then inserted into the ground or bottom, at exactly equal distances each from the centre guide-pile, and at exactly equal distances from each other, forming, of course, so many points in a great circle. Between each pair of piles so placed is next inserted a segmental piece of cast iron, termed a bed socket. One of the segments being placed between each pair of piles, and resting its angular edge upon the ground or bottom, forms consecutively a circular, grooved, and socketed surface to receive the parts of the superstructure, as follows: Upon each pile is now fitted a tubular piece of cast iron, with projections at opposite sides. The lower end of this tubular casting fits into the socket of the bed plate, and the projections on its opposite sides form a perpendicular groove, in which are received the edges of the pannels, and which pannels and tubular pieces have a uniform circular surface. The shell of the foundation is then completely formed, and is now strengthened by a series of tension rods hooked on to the several tubular pieces and other parts, if found to be necessary, and all these tension rods are set up to the centre guide-pile by means of swivel screw-joints. The cylindrical cast iron shell thus formed is then to be filled in with stone, concrete, or other filling, as may be found expedient.

"To protect the bed sockets aforesaid from being undermined and disturbed from their proper level, by the action of tidal currents, I adopted the following plan: As soon as the circle of iron piles is completed, I put down outside thereof a complete circle of pieces of cast iron, say six feet in length and diameter, of a converse segmental form; and these segments are all shackled together by bolts passing freely through hinge bosses cast on their inside angles. Two or more of these concentric circles of these segments are thus put down, either by means of a diving bell or other hydro-pneumatic apparatus, and it is apparent these segments, when undermined by the action of the current, will descend, generally, and thereby enclose and protect the surface which they respectively cover. It is assumed, also, that these segments will so deflect the tidal current from the main body of the work, about its base, that no process of undermining can take place; though, as an additional security, the spandrels between the converse surfaces of these segments should be filled in with clay or stone as soon as the bed plates are fixed in position. In another form of these segments for protecting the bottom from abrasion, it is proposed to cast it as a hollow box, whose transverse section should be triangular, with hinge bosses for shackling the pairs together. This form would more effectually exclude the water from acting upon the surface enclosed by these segments.

"The application of this mode of forming the shells of piers, breakwaters, &c., where the plan is rectilinear instead of circular, must be obvious without details."

Dredging machines.—Two patents have been granted within the year for machines of this class, intended for the deepening of channels, &c., and two for excavating and ditching. One of these patents is for an improvement upon those dredging machines which effect their excavations by a scoop, having a long handle by which it is thrust down, and is afterwards filled and elevated by a proper arrangement of blocks and rigging, by operating which the proper motions are given to the scoop. The mast with which the rigging is connected has heretofore been stationary; but the patentee, believing that the operation would be facilitated thereby, has arranged and properly supported the mast upon circular rails, by which it is made movable, and the operations of the machine extended.

The other dredging apparatus is intended to operate upon a large scale, and will be understood by the perusal of the following claim which was granted to the patentee:

"What I claim as my invention, and which I desire to secure by letters patent, is the before-described mode of scraping the bottoms of rivers by operating a floating scoop by power machinery, placed in a separate vessel anchored on the opposite side of the river, said floating scoop being attached to an anchor up stream, so that the current will carry back the scoop to the opposite side of the river at the termination of every operation of the said scoop for a repetition of the scoop; the vessel containing the engine being moved up or down stream, as the work progresses, by the power of the engine, as described."

One of the ditching machines patented consists of a series of cutters, such as have heretofore been used for cutting and forming the sides of the ditch, in combination with a scraper which follows them for cutting the bottom and conveying the excavated earth to the side of the ditch, and firmly depositing it there. The edge of the scraper is in a common form, but the body of it is warped or twisted in such a manner that, as the excavated earth passes along over its surface, it is so turned as to fall and be pressed upon the bank with the turf side next to and extending up from the side of the ditch. In the western prairies, where wood for fencing is difficult of access, these ditches and levées are valuable substitutes, and machines for constructing them with rapidity and economy are of very great importance.

A mode of raising sunken vessels or recovering their cargo has been patented within the year, which is said to have proved very successful. Circumstances are often such that it could undoubtedly be very advantageously employed. The description of the apparatus and mode of operating are as follows, nearly in the words of the inventor:

"The nature of my invention consists in the employment of a cloth or flexible caisson to surround the wreck for the purpose of excluding the surrounding waters, so that the water within the vessel and caisson can be pumped out, and in the employment of a frame or frames to be erected above the vessel for the purpose of giving access to any part of the vessel; and also in connecting with such cloth or flexible caisson a pump or pumps, suspended to a steamboat or other vessel carrying the motive force for pumping water from the caisson and wreck.

"The flexible caisson is made of canvass or other cloth, of sufficient size to surround and encompass, and extend sufficiently low to cover, all the leaks in the wreck. It should be made water-proof by any of the known means, and of sufficient strength, by repeated layers, to resist the pressure

of water. The lower edge is lapped over, or hemmed, to embrace a chain which extends entirely around, to act as a sinker, and enable the pressure of the surrounding water to force the cloth or caisson up to and under the bottom of the wreck.

"For the purpose of getting access to the cargo of a wrecked vessel, I employ in combination with the flexible caisson a frame, which I denominate a platform, the construction of which should be varied to suit the peculiar situation and condition of the wrecked vessel. I shall here set forth the mode most generally applicable. In the first place, I make a frame about twelve feet in length, and as wide as the wrecked vessel, enlarging the same if it becomes necessary in the operation of saving the wreck or cargo. The said frame consists of two bents placed twelve feet apart, and secured together by four girts, two at each end. When the frame is thus constructed, I attach it to the vessel by means of bolts, screws, chains, or other fastening, so as to render it a firm fixture to the wrecked vessel. The frame is then made to receive timbers and floorings, putting it in readiness for operations on the wreck.

"When the wreck is wholly under water, I build a temporary frame around the sides of the wreck, extending from the deck or uppermost part of the wreck above the surface of the water. When the wreck is only partially covered with water, the temporary frame may only extend around that part of the wreck which is submerged; and in case the upper part of the wreck is out of the water, but a part of it is stove in or broken, or is otherwise rendered so leaky as to interfere materially with the water being pumped out, I make the frame-work of such extent and in such places as may be required by the particular circumstances.

"The flexible caisson encircles this platform or frame as well as the vessel, and by this means access can be had to any part of the inside of the vessel for the purpose of removing any portion of the cargo, or closing up the leaks, if the intention be to raise the wreck."

Railroads.—Four patents have been granted during the year for improvements in railroads, and of these two are extensions of well known patents. The other two do not present striking novelties, but nevertheless the inventions appear worthy of attention. The objects at which the inventors seem to have aimed are permanence and simplicity. The following extracts from one of these patents will sufficiently set forth the nature of the improvement:

"I do not use either string-pieces or cross-ties of wood or stone, but I make them of iron. The lower portion of the string-piece, which I will call the under rail, has a broad bearing upon the road bed, and I connect them together laterally and longitudinally by means of iron cross-ties and chairs formed in one solid piece.

"The base of the under rails may be made ten or twelve inches wide, and threee-fourths of an inch thick. The stem which rises from the middle of the base may be seven inches high, and three-fourths of an inch in thickness. The top of the stem is enlarged where it is to receive and embrace the top rail. Along this enlargement of the top of the stem a groove or channel is formed, which is to receive, first a strip of hard wood, kyanized, or other elastic substance, and upon this is placed the top rail. The strip of wood may be about an inch thick, and the channel should be about an inch and a half deep, so as to embrace the base of the upper rail to the depth of about half an inch. The width of the channel should

be about two inches and a half, or of such width as may be rendered necessary by that of the top rail."

"Having thus fully described the nature of my improvement, and shown the manner of carrying the same into operation, what I desire to secure by letters patent is, the use of the continuous strip of wood, or other elastic substance, combined with the under rails, as described herein, and with the wrought or cast iron top rail, of the plate, or bridge, or any other form, substantially in the manner set forth.

"I also claim the manner of connecting and holding together the upper and under rails of iron, as herein described, so as to make the under rail serve as a *chair throughout its whole length* to the top rail, (the latter being imbedded in a channel in the former,) or, as in the other described plan, where the top rail is grooved on the under side, and rests on the under rail as a saddle, thereby giving strength and stability to the joints of both the upper and under rails.

"I claim the use of cast iron top rails, when in connexion with iron under rails."

During the past year the attention of engineers appears to have been more than usually drawn to the subject of ascending and descending inclined planes by locomotive power. Each particular locomotive requires slight modifications of the track, though I have seen none which presented patentable changes. There are few railroads upon which inclined planes are necessary; and it is to be regretted that engineers have heretofore thought it expedient to leave such obstacles in the way, to interrupt travel and transportation, and to tax their own ingenuity, their time, and their purses, in devising means of overcoming them. The inconveniences, delays, and expenses, resulting from these obstructions, would, in a few years, amount to more than would have been sufficient, at the outset, to construct the road in such a manner as to have avoided them, and allowed the ordinary locomotive, with its train, to move on quietly from one extremity of it to the other. More than the necessary expense of a proper construction is ultimately incurred, and still the delay and inconveniences must be submitted to, and the inclined plane still remains a monument of injudicious and shortsighted economy. But as they exist, trains of cars must ascend and descend them; and in another place I shall remark upon such improvements in locomotives as have been patented during the year for the accomplishment of this object, and will here, as connected with this subject, call your attention to an improved "atmospheric railway," for which letters patent have been granted in this country within the last year to a foreigner.

Notwithstanding the serious objections which have been urged against this mode of conveyance, any one of which would be sufficient to establish its inutility for general purposes, it seems recently to have attracted much attention, particularly in Europe; and it has finally been suggested that it may be rendered very useful in ascending and descending inclined planes. In my judgment this suggestion is a valuable one, and worthy of attention and experiment. The shortness of the tube, for this purpose, would be such as to remove, in a great measure, the danger of imperfections in it, and the liability to accidents, which can scarcely be avoided when the length is great. And, again, the parts can be so constructed and combined that the descent of one train of cars, while they are controlled by the atmospheric apparatus, will exhaust the tube, and thus prepare it

to become a powerful auxiliary in effecting the progress of the ascending train. Great perfection in the cylinder, or tube and piston, would of course be required. Thus it sometimes happens that an invention, which fails in its application to the purpose for which it was intended, may be successfully applied to purposes which, at the beginning, were scarcely contemplated.

The invention for which letters patent were granted, as above mentioned, is so described by the inventor that it cannot be understood without drawings. Its general characteristics, however, may be described as follows, viz: The tube is so constructed that it has no lateral openings, except into air-tight chambers. The piston has considerable length, and is furnished with a rack upon each side. In the lateral air-tight chambers, opposite these racks, are placed pinions working into the racks upon shafts which extend up through the top of the chamber, and upon which shafts pinions are placed, working into fixed racks upon the car which is to be propelled. At the top of each box, or air-tight chamber, a conical opening is made for the shaft, like a valve seat, and a conical collar to fit is placed at the proper point of the shaft, so that when the air is exhausted from the tube or cylinder the external air will press down the valves and keep the chambers tight. As the air is withdrawn from one end of the tube, the piston, by atmospheric pressure, commences its motion, the racks upon it take into the pinions upon the lower ends of the vertical shafts above mentioned, causing them to revolve, and with them the pinions on the upper ends of the shafts, which, taking into the racks on the car, propel it forward. The racks upon the piston, and those upon the car, are of such length, that, before they are disengaged from one pinion they engage with the next. When the head of the piston has passed the opening for the pinion, the shaft of the pinion is, by a suitable device, raised so that the friction of the valve upon the seat is avoided.

It is unnecessary to comment upon the merits of this modification of the "atmospheric railway," as I deem the general remarks which have already been made amply sufficient. The subject has been fully and ably discussed in the foreign journals.

Railroad cars.—Several applications have been made within the year for improvements in cars for ascending and descending inclined planes. Some of them are still pending, and upon one of the applications letters patent have been granted. The invention, however, presents but little novelty, and does not appear calculated to accomplish in practice all that the inventor contemplated. Public attention has been called to it through the papers and otherwise, and I do not deem a description of it necessary.

Locomotives of this kind are either such as are used on the inclined plane only, or such as are intended for use upon all parts of the road. When either kind is substituted for the stationary power, the expense of the track and its liability to derangement are much increased; accidents in ascending would certainly not less frequently occur, and the power must be sufficient not only to carry up the trains, but also the immense weight of the locomotive. When, therefore, the former or extra locomotives are thus substituted, the result must, in my judgment, present diminished security and increased expense. When the latter are resorted to, and the same locomotive is used for ascending inclined planes and for locomotion on all the other parts of the track, the obstacles are no less formidable. All the objections above mentioned are still incident to the

system, and, in addition, the locomotive must be much stronger and heavier in all its parts than is necessary or convenient on the level part of the road; and to this must again be added the great weight, expense, and liability to derangement, of the additional machinery *necessary* to the ascent of the inclined plane, but which increases liability to accidents on all parts of the track. When these circumstances are taken into consideration, and it is recollected that all these expensive incumbrances must be hanging about the locomotive, and impeding its progress for perhaps one hundred miles, and can only be made useful for half a mile, it will perhaps be concluded that inventive genius can be more advantageously exercised in some other branch of the arts than upon locomotives for ascending inclined planes.

Nine patents have been granted within the year for improvements connected with locomotives and railroad cars. Some of them could not be fully understood without drawings. They are for improvements in hanging car bodies so as the better to equalize the weight upon the wheels, and to give greater ease of motion; for an improved connecting link; for replacing cars which have been thrown off the track; for improvements in car wheels; for removing trucks by the use of a drop platform, and for a mode of connecting the wheels of locomotives, so that they shall all operate as driving wheels. It is not necessary particularly to describe them.

The anti-friction box for axles, &c., in which the axle, &c., turns upon friction rollers, has heretofore been liable to serious objections—which appear to have been to a great extent removed by an improvement patented within the year. The inconveniences heretofore experienced, and the inventor's mode of obviating them, will be understood by reference to the following extracts from his patent:

"The nature of my invention consists in providing the axle and box with beveled or mitred shoulders or collars, in connexion with anti-friction rollers, having the ends of corresponding form, to substitute rolling for rubbing friction at the ends of the rollers—as it is well known that in the use of anti-friction rollers in the boxes of carriages and other axles much friction in guiding the rollers, when made square or round as heretofore, has been unavoidable; but by this arrangement rubbing friction is entirely avoided, and rolling friction substituted therefor; and hence much jar may be avoided by keeping the flanches close up to the ends of the rollers."

"By thus beveling the ends of the rollers, and the shoulders on the axle and box, it will be obvious that where the bodies come together, in avoiding end play, the rubbing friction heretofore experienced is avoided, and rolling friction substituted therefor.

"I do not claim as my invention the employment of a series of rollers, connected by rings at each end around an axle, and within the box, as this has long since been done; but what I do claim as my invention, and desire to secure by letters patent, is making the ends of such rollers on a bevel or mitre, in combination with shoulders, collars, flanches, rings, or other projections on the axle and on the box or hub, having corresponding bevels or mitres to avoid the rubbing friction at the ends of the rollers, and the more effectually to prevent end play, substantially as herein described."

Bridges.—But one patent has been granted during the past year for improvements in bridges, and that was granted for a slight modification in

the mode of producing the camber, and need not be here described. Several applications for patents under this head have been made, some of which are still pending; but most of them have been rejected for want of novelty. For some years past, very few substantial improvements have been made in this branch of civil engineering. There are periods in the history of all the useful arts during which their progress appears to be suspended, as if they had already attained the full limits which science assigns them. But often, after a long interval of rest, during which all have followed tamely in the footsteps of their predecessors, some ingenious and original mind arises, boldly leaving the beaten track, and, as he explores untrodden paths by the light of his own genius, new wonders arise to mark and signalize his progress.

LAND CONVEYANCE.

Carriages.—Seven or eight patents have been granted during the year for improvements in carriages, wagons, and carts. Some of the inventions patented, such as self-acting cart bodies, &c., evince much ingenuity, but do not present that degree of practical utility which could be desired. In such vehicles as wagons and carts, a reasonable degree of cheapness, simplicity, and durability of all the parts are indispensable; and if these are lost sight of, it is immaterial how much convenience and saving of labor its extra and unusual fixtures may effect. The labor which such machinery saves is not very expensive, and is saved to very little purpose, as it cannot be otherwise usefully employed; while a derangement of the parts might render the whole inoperative, even with the assistance of the attendant.

The patents above alluded to are for improvements in wheels, in the hanging of carriage bodies, in axles, and in brakes. They are all slight modifications of devices long and well known, and I do not deem it essential that a description of any of them should be here given.

The most striking improvement patented within the year, in this class, is the prairie car. This invention is not presented with the noisy pretensions which frequently characterize the advent of new discoveries, but seems to claim for itself no more than experiments justify us in believing it can accomplish. It is not intended to rival the railroad system, where that can be successfully established and sustained; but it is intended for prairies, and other level and unbroken grounds, where no road is necessary to be built for it, and where the amount of travel and transportation will not justify the construction of railroads. Within these limits it promises great usefulness, as there are extensive regions in the west which present an appropriate field for its successful operations.

The prairie car consists of a frame of proper strength and dimensions to sustain the steam engine or other superincumbent weight. This frame, instead of resting upon ordinary wheels, is supported by hollow cylinders of a convenient diameter, and very wide tread. These cylinders are placed upon axles and constitute the driving wheels. The cylinders are made hollow, for lightness, and close, to prevent the entrance of mud or other matter, and the tread is very broad to prevent sinking into soft earth, &c. Two smaller wheels of similar construction are placed upon axles in a separate frame at one end of the car to guide it. This frame turns upon a pivot, by which it is connected with the main frame, and is ope-

rated by such means as are convenient for steering. The foregoing are the prominent features of the car or locomotive. The propelling power is applied to the driving wheels in any convenient way. There is much originality in the idea of traversing the prairies by steam cars, upon their natural and unbroken surfaces, and much merit in adapting the cars to the nature of this novel undertaking.

There is nothing further in this class which demands particular attention.

Mills for grinding, and machinery connected therewith.—Nearly twenty patents have been granted during the year for improvements upon the various kinds of grinding mills, and the machinery connected with them, including horse-powers. They have generally been granted for very slight and unimportant changes in the machinery, already well known, and are calculated to exert no considerable influence upon this branch of industry. Some of these improvements, however, are worthy of notice in this place. A few omissions will be necessary, however, from the fact that drawings are necessary to a clear understanding of the subjects.

Flouring mills.—Several patents have been granted for this variety of mill; one for pulverizing the grain in a kind of mortar, having a series of pestles, and regulating the discharge in such a manner that the flour cannot escape until it has become sufficiently fine.

Serious inconvenience frequently results from the heating of the stones by great rapidity of motion and friction. The flour becomes burnt and injured. Precautions against this inconvenience had already been taken, which were more or less effectual. Within the year, letters patent have been granted for a new mode of diminishing the heat. It consists of an air tube, extending entirely around the stone at the outer part of its grinding face, from which branches extend along the grooves in the face of the stone. The whole is connected with apparatus, such that a constant current of cool air passes through the tubes, by which the stones are to be kept at a proper temperature.

After grinding, the flour passes through a bolting machine, by which it is sifted, and the different qualities separated from each other. At the lower end of the bolt, the sifting medium is coarser than at the upper end, the upper end allowing only the finest flour to pass through into the trough below. A portion of the finest flour, however, will adhere to the coarser part, and pass down and be deposited with it, and thus constitute a portion of the inferior article. To save the fine flour thus liable to be lost, an improvement in the bolt has been made and patented, which consists of diagonal or spiral vanes or scrapers attached to its exterior surface, near the lower end, which, as the bolt revolves, scrape or carry a portion of the "middlings" up along the trough and deposite it in the tube through which it is conducted to the carriers, and passed a second time through the bolt. This operation is supposed by the inventor more perfectly to effect the desired separation.

Several patents have been granted for improvement in mills for cutting and grinding corn in the cob. They generally receive the cobs endwise, through the stationary grinder; and, by knives on one grinder and rests on the other, the cobs are cut into short pieces, which afterwards pass through the grinding part of the mill. These mills are but slight modifications of such as have been formerly used, and a more detailed account of them would shed no important light upon this variety of machinery.

Bark mills.—Several patents have been granted for improvements in mills for grinding bark, some of which are also adapted to grinding corn in the cob. The differences, however, between them and those formerly in use are so trifling that I do not feel justified in going into a description of them.

Letters patent have been granted for a coffee mill, (which, however, may be used for other purposes,) consisting of a conical cone, surrounded by a hollow cone, which is divided longitudinally into narrow sections, between which strips of steel are placed extending into the interior of the mill, and serving as teeth for grinding. On the outside of this hollow cone, and resting against the backs of the strips of steel, hoops are placed, which, by being contracted or moved towards the base of the cone, will force in, and thus lengthen the teeth, as they are found to be worn off. I have described this mill because of the peculiarity which it appears to present, but not with a view of expressing an opinion respecting its utility.

Horse-powers.—Applications under this head have been quite numerous during the past year, but most of them have been rejected for want of novelty. As the "horse-power" consists merely of the machinery which serves as a medium for communicating the power of the animal to the machine to be driven, it naturally follows that the field which it presents for the inventor to occupy is very limited. Narrow as it is, however, multitudes have for years been striving to gather laurels upon it; with what success, it is not difficult to judge *a priori*. But, notwithstanding the vast number of inventions and re-inventions which have been made in this kind of machinery, the subject does not appear to have been entirely exhausted. Five patents have been granted during the year, one of which is for improvements which render the machine so convenient, compact, and comparatively free from friction, that I deem it well worthy of notice. It is impossible to present a perfect idea of it without drawings; but the following extracts from the patent will convey a general outline:

"The nature of my invention consists in arranging two series of cog or belt wheels upon two sets of shafts; each wheel, with its pinion, being on a section of one of the shafts, and the sections of each shaft working one within the other, and running in the same direction, instead of the reverse direction, or upon permanent sleeves, receiving one section within and the other without; the advantages of which arrangements will be fully pointed out hereafter.

"By the arrangement of the two series of wheels upon the two axes, transferring the motion from the first to the second, then back to the first, and then again to the second, and so on to any number of wheels, the shaft of one wheel turning on the shaft within it, and (as the result of the arrangement of the wheels) in the same direction and with greater velocity, the friction occasioned by the turning of the outer section on the inner tends to carry it around, and thus greatly reduces the actual friction; but another important advantage resulting from this arrangement of the wheels, besides that of great compactness, is the relieving the shafts from much of the pressure, unavoidable, in the usual mode of gearing up.

"Having thus fully described the characteristics of my invention, and the manner of making and using the same, I wish it to be distinctly understood that I do not make claim to the employment of a series of wheels, having the same axis of motion when the sections of the shafts are separated from each other by a permanent sleeve, or without the sleeve, when

the arrangement of the wheels is such as to cause the sections of the shaft to turn in reverse directions, as these are well known, and do not attain the end contemplated by me and pointed out above; nor do I claim simply oiling a journal through a perforation in the shaft, as this has long since been known; but what I do claim as my invention, and desire to secure by letters patent, is the arrangement of two sets of cog or belt wheels, and pinions connected therewith, each set consisting of not less than two wheels, with their appropriate pinions, or two shafts made in sections, turning on each other, and in the same direction, for the purpose of avoiding friction, and rendering the machinery compact, as herein fully described.

"And I also claim, in combination with the arrangement of shafts herein described, the oil passages, whereby the oil, applied at two places, is conducted to all the rubbing surfaces of the series of shafts and bearings, as herein described."

I do not deem it proper to extend my remarks to any other inventions belonging to this class.

MACHINERY FOR MANUFACTURING AND WORKING LUMBER.

This class comprehends a great variety of machinery; but, as nearly all its branches have attained a high degree of perfection, fewer striking improvements are to be expected than in some of the other classes which are of more recent origin, or those which, in some of their branches, require greater nicety or complexity of machinery.

Saw mills.—Four patents have been granted, within the year, for saw mills: three for ordinary sawing of boards, &c., and the fourth for sawing irregular shapes. The former are for improvements in the carriage and apparatus for setting the log or making the mill self-acting. Saw mills have long since been patented, which, after the log is properly placed upon the carriage, the various parts of the machine adjusted, and the gate, which admits the propelling power, opened, will saw the whole log into boards of any one thickness required, and close the gate and stop the machinery after the work is done. This being the case, it will be readily perceived that, so far as results are concerned, but little remains to be done for the self-acting saw mill.

The improvements patented as above mentioned, are for modifications in the means of effecting some one or more of the above operations; but no new effect has been produced. The mills above alluded to, are too complicated to be understood without drawings; and, although useful, a minute description of them would add but little to the information formerly extant upon this subject.

Letters patent for an improvement in mills for sawing irregular shapes, such as blanks for gun stocks, &c., have been granted within the year, of which the following is an outline: An ordinary saw gate is arranged in the usual way for giving the up and down motion to the saw. The saw is connected to this gate by levers having their fulcra upon the top and bottom of the gate, which levers extend both in front and behind the gate. The ends of the levers opposite to those jointed to the saw are connected to each other by a rod. The carriage carries the plank to be sawed towards the saws in the usual ways. To this carriage grooved guides or patterns are attached, which are adapted to the shape to be sawed, and to

each other. Through sliding blocks in these grooves the saws work. With this arrangement of parts, it will be perceived that, as the carriage advances, the guide and block give the proper direction to the edge of the saw, and the levers permit the proper lateral motion. Thus, as the carriage moves on, the saw gate gives the saw its up and down motion, the levers allow its lateral motion, and the guide and block, through which the saw passes, give a proper direction to the saw. Any number of saws, similarly guided, may be used.

Planing machines.—Eight patents have been granted within the year for improvements in planing machines. One of them, however, was a mere reissue of the extended patent for the well known "Woodworth machine." This machine seems to comprehend all that is necessary for planing, tonguing, and grooving regular surfaces; and therefore inventors have not sought to improve it, but have confined themselves principally to the invention of such machines as may be substituted for it, or to those which perform other kinds of planing. The subject is vastly important, and no effort which ingenuity, prompted by interest, can make, has been spared in attempts to accomplish the grand object of producing a machine which, without infringing the patent, may be successfully substituted for the "Woodworth machine." Whether the machines patented infringe pre-existing patents, or may successfully compete with them, is not my province to determine; it is sufficient for this office that they present points of novelty, and for these letters patent have been granted.

One of these patents is for an improved mode of confining the cutter in its stock, which is effected by a conical screw instead of the ordinary device. Another is for improvements in various parts of an entire planing, tonguing, grooving, and beading machine, which cannot be understood without drawings and an elaborate description. Another feeds by endless belts of bars or slats, carried by rollers, and supported between the rollers by platforms on both sides of the board to be planed; and this apparatus is combined with a cutter whose shaft is placed diagonally to the board, and, with a gang of adjustable saws, to divide the board into strips of any desired width.

When the lumber to be planed is very thin, such as shingles, &c., great inconvenience is likely to arise from its vibrations during the operation, which render it impossible to give the surface the desired smoothness. To remedy this evil the cutters have been made to work through a plate, the sides of the opening being so levelled as to render it as small as possible. Upon this plate the shingle, &c., to be planed, is placed, and is of course pressed more uniformly and nearer to the point where the cutter is operating, than would be possible with the rollers which are ordinarily used.

I will notice but one other patent for improvements in planing. This improvement is intended for planing, or rather smoothing, surfaces which are irregular in one direction—to wit, longitudinally—such as the legs of piano fortes, which are polygonal in their cross section. The ordinary cutter is used with sliding boxes on each side of the block to be smoothed, and attached to the carriage is a guiding groove, through which the cutter shaft passes, and by which, as the carriage moves on, the cutter is raised or depressed, according to the shape which the block is to receive. The different sides of the block are successively turned to the cutter to bé smoothed.

Several patents have been granted within the year connected with boring, mortising, tenoning, and turning, but none of them present the strongly marked features of novelty which would entitle them to particular notice in this place. They are but slight modifications of previously existing machinery.

Barrel machinery.—The only patents granted this year connected with coopering, are for improvements upon various parts of an entire set of barrel machinery. Of these patents there are two, both of which are too complicated to be understood without drawings. These machines are calculated to operate well, but do not sufficiently differ from the machines already in use to exert any important influence upon the branch of manufactures with which they are connected, or to render a description of them in this place particularly important.

Lath machines.—Two patents have been granted within the year. Both of them seize and gripe the block while the knife is operating upon it, and release it when the knife is withdrawn, to allow the block to fall down before the knife, preparatory to another cut. This operation is effected by machinery, differing in one machine from that used in the other, both of which are patented. One of the machines has also an improved mode of clearing itself from splinters, and of delivering the laths in parcels of such numbers as may be desired.

Shingle machines.—But one patent has been granted within the year for improvements in machinery for cutting shingles, and that is adapted to cutting them of a peculiar form. The shingle cut by this machine does not taper from one extremity to the other, but the taper is confined to about half the length of it at one end, the faces of the remaining half being parallel to each other. This shape of the shingle avoids the bending which is incident to those of the ordinary form, when nailed upon the roof—an object well worthy of attainment. Patents have been heretofore granted for machines to cut the ordinary shingle, until the subject appears to be exhausted.

Splint machines.—The manufacture of friction matches has become so extensive in this country, and the necessity of offering them at a low price is so absolute, that any improvement which facilitates their manufacture is of very considerable importance. Machines for manufacturing the splints with great rapidity and economy have heretofore been patented; but after the splints are made, they are placed in a kind of a lattice work rack in considerable numbers, where they are held for the purpose of dipping. This requires considerable time and labor. To facilitate this operation, a machine has been invented and patented within the year for cutting the splints, and at the same time arranging them in the apparatus for dipping, so that no more time or labor is required than if the splint were made and dropped from the machine. To effect this, the block of which the splints are to be formed is carried against a tube cutter, whose tubes diverge a little and communicate at their outer ends with other diverging tubes, which again communicate with the openings in the dipping frame intended to receive the splints. As each successive splint is cut and passes into the tube cutter, it forces out the splint previously cut into the tube beyond, and thence in the same manner it is forced into the dipping frame, which advances as it is filled, presenting new openings for the splints as they are delivered from the machine. The machine manifests much ingenuity, and promises great usefulness.

FIRE-ARMS AND IMPLEMENTS OF WAR.

But two patents have been granted within the year for improvements in fire-arms, one of which is for an improvement of the "continual prime," and its application; and the other is for an improvement in the manufacture of wrought iron cannon. Both of these inventions are said to be of vast importance, and I therefore consider it my duty to call your particular attention to them.

"Continual prime" has long been in use, particularly in Europe. It consists of a small and very flexible tube filled with percussion powder, and flattened. A long strip of this is placed in some convenient cavity in the stock or lock of the gun, from which it is fed to the required point by any convenient device. The end of this prime is so situated that, as the cock descends upon the nipple, it cuts off a small portion of the prime, carries it down upon the nipple, and explodes it. As the percussion powder extends uninterruptedly through the whole of the strip of prime, the whole is sometimes exploded by being cut off, and sometimes by the explosion which takes place between the cock and the nipple. This renders the use of continual prime too unsafe for practical purposes, although it would otherwise be of great value. The improvement above alluded to is intended to obviate these inconveniences, and appears well calculated to attain the object at which it aims. The following extracts from the patent will give as clear an idea of the invention as can be presented without drawings:

"The nature of the first part of my invention consists in so making primers of fulminating mixtures, or such compounds as ignite by percussion, as to have a series of any number of primers in a continuous strip, but each separated from the others, to prevent the communication of fire from the one exploded to the others; by means of which, a magazine of such primers can be carried in connexion with the gun or other fire-arm, and each primer exploded without any danger of communicating the fire to the rest in the series.

"And the second part of my invention consists in connecting with all kinds of fire-arms, such as cannon, guns, pistols, &c., a magazine for containing primers, made in accordance with the first part of my invention, from which the primers may or can be fed forward to the place where they are to be cut off, preparatory to being exploded, or directly to the place of explosion; this magazine being so connected with the hammer or other moving part of the lock as to push forward the primer by the movement of the lock.

"The mode of making the series of primers, under the first part of my invention, which I prefer, is that represented in the accompanying drawings, and is as follows, viz: A strip of paper, either in a moist or dry state, is, by means of appropriate instruments and by the application of pressure, forced out into cup forms, the spaces between the cups being sufficient to prevent the communication of fire from one to the other. These cups are filled with the percussion or fulminating mixture, even with the original surface of the strip; it is then coated with a varnish of gum lac dissolved in alcohol, and covered with a thin strip of paper, and the whole is then varnished over, which renders it imperviable to moisture. It is important that the two strips of paper be made to adhere in the spaces between the several cups containing the fulminating compound, and that none of the mixture be deposited or left on the spaces or divisions. The method which I have pursued in making these primers is, to form the

cups in the paper by forcing in the mixture, the one operation being sufficient instead of two; and it will be evident that this can be done by placing the strip of paper on a bed, having a countersink of the form intended to be given to the cup, and laying the paper thereon, and the mixture forced into it by a piston working in a hole in a plate placed above the paper to keep it in place, and to hold the mixture and form a guide for the piston."

"What I claim as my invention, and distinguished from all other things before known, is, first making primers of fulminating mixtures or such compounds as ignite by percussion in a continuous series; each primer, or any two, or greater number, being separated from the others by a substance which is more or less combustible than the fulminating mixture, by which one or more may be exploded without communicating fire to the others.

"Secondly, the mode herein described of moving and measuring out the primers by the movement of the lock, substantially as described."

It will be perceived that the prime, from the peculiar shape given to it, is such, that machinery for feeding it can be made to operate upon it with great accuracy; and it is therefore the less important to describe the feeding apparatus, which would require drawings.

The subject of the second patent above mentioned will be clearly understood from the following extract:

"This improved cannon is formed of a series of rings or short hollow cylinders, of wrought iron or steel, or of wrought iron and steel combined, which rings are joined together by their ends in sufficient number to make the length required for the whole cannon. Each ring or cylinder is formed by winding or turning a piece of iron of the thickness required for the walls of the cannon round a mandril, and welding its ends together by a scarfed joint; or, second, several rings may be formed of thin iron, and of different sizes, so that one shall slip over the outside of another, until a sufficient thickness for the cannon shall be attained, when, by welding these several rings together, a single ring is obtained; or, thirdly, long bars of iron or steel of a width equal to the length of a ring, the ends being scarfed down, may be wound over a mandril or spindle, in the manner that pieces of riband are wound upon a block. These spirals being welded together, form a complete ring or hollow cylinder; or, fourth, long and narrow bars may be wound upon a mandril, side by side, and upon the top of each other, until sufficient length and thickness be attained for a ring; and these turns being welded together, the ring is formed.

"They are next to be heated and placed end to end, and welded together, and thus a hollow frustum of a cone is formed of a length required for the cannon. The trunnions are to be welded upon the sides of the cannon, either before the full length is made out, or when it is completed, or they are welded upon a separate ring or band larger than the cannon, and secured to the same by a screw, the thread of which is cut upon the outside of the cannon, to fit a corresponding thread cut upon the inside of the ring. The breech pin may be screwed into the cannon after the cannon is bored and turned, or it may be welded in previously to finishing the cannon.

"What I claim as my invention in the foregoing specification is this, viz: I have invented a new and improved kind of cannon, which is formed of a series of rings or short hollow cylinders, joined together by their ends,

in sufficient number to form the length required for the cannon; and for this I claim letters patent."

The process of the patentee differs but slightly from some of those previously resorted to, but his practical results may be widely different. The *principal* obstacle which has heretofore been met with in the manufacture of wrought iron guns has not consisted in the difficulty of forming or welding the parts of which the gun has been composed, but in welding these parts to the already partly formed gun—(and this part of the process does not appear to have been particularly improved.) For this purpose it is necessary, at each successive welding, to raise to a welding heat the large mass of iron to which the parts are to be joined. When the guns are comparatively small, they may bear this process without serious injury, and without great danger of imperfections in the welding; but when the gun is very large, the intensity of the heat required, and the readiness with which iron combines with oxygen, carbon, and other impurities to which it is necessarily exposed during the process, are such, that the iron becomes deteriorated, and a perfect weld is rendered a matter of extreme difficulty, if not impossibility.

In all ages, since the invention of cannon, attempts have been made to construct them of wrought iron; but when subjected to experiment, they have uniformly failed, and gone out of use. When they have been burst by powder, or otherwise broken, the fractures in their different parts have presented almost every variety—from tough, perfectly welded wrought iron, to the coarsest granular; and at many points the metal does not appear to have adhered at all. The features of the iron above mentioned may be found in fragments of the gun which recently burst on board the Princeton. Until some improvement in welding, not hitherto known or practised, shall have been discovered, to obviate the imperfections which now appear to be incident to it, it is to be hoped that no attempt to introduce very large guns of this kind will be successful.

Further remarks might be made upon this subject, which is at the present time one of vast importance; but I withhold them, as they would lead me beyond the proper limits of a report.

HYDRAULICS AND PNEUMATICS.

Since this class came under my charge, applications have been numerous; but they have generally been rejected for want of novelty, or are still pending. But one patent has been granted, which was for an improvement in the fire engine, which consists in so constructing the machine that one pair of its wheels, while the engine is in operation, may operate as fly wheels to equalize its action.

In looking over the list of patents granted within the last year, I find none of a miscellaneous character which require particular notice. Several have been granted not properly within any of the classes herein before reviewed, but they do not possess that degree or kind of novelty which would render them the subject of useful remarks.

In reviewing the patents for the year, it has been my object to call your attention to such, and such only, as indicated progress—to those which possessed important usefulness in themselves, or that peculiar and striking novelty which is calculated to render them a centre, around which future inventions will cluster. I have sought to show you not only that

the arts have progressed, but to trace out the important steps by which they have advanced.

If improvements deserving notice have been omitted, it has arisen from inadvertence; and if unimportant inventions have been rendered too prominent, I have erred in judgment. Enough, however, has been developed to show that inventive genius has not slept, but has steadily shed its cheering influence upon every department of the useful arts.

Some of my remarks may, perhaps, be regarded as strictures; but they were not written in unkindness, nor in a dictatorial spirit of self-sufficiency. They are presented with all diffidence, and with a sincere desire that some among the less informed class of inventors may derive advantage from their perusal. The learned I do not presume to instruct; and where I have erred, I shall rejoice in the discovery and correction of the error.

The duty assigned me is performed, and the results of my labors are respectfully submitted.

W. P. N. FITZGERALD,
Examiner of Patents.

Hon. Edmund Burke,
Commissioner of Patents.

January 21, 1846.

I.

Letter from Professor Morse, upon the magnetic telegraphs in operation in Europe.

NEW YORK, *February* 2, 1846.

DEAR SIR: In compliance with your request, that I would give you some facts in relation to my electro-magnetic telegraph illustrative of the difference between my system and other systems more recently established in Europe, I would say that, with a view of personally examining electric telegraphs in England and France, I made a rapid tour in those countries in the autumn of the last year. The electric telegraph most in use at present in Great Britain is that invented by Messrs. Cook and Wheatstone, the former of whom, it appears, had his attention first drawn to the subject at Vienna, in 1836, and Professor Wheatstone dates his own invention from the year 1837.

The electric telegraph upon the Paris and Rouen railroad is the joint production, I believe, of M. Foy and M. Brequet, and conceived and executed within the last two years.

To illustrate more perfectly the difference between my system of magnetic telegraphs and the two just mentioned, I will briefly describe the two European inventions. The principle of mine has been already described in a former report of the Commissioner of Patents, and it is, therefore, unnecessary to repeat the description of its machinery.

For the abbreviated description and plates of Wheatstone's rotating disc telegraph, invented by him in 1841, as an improvement on his former plans, I am indebted to my ingenious friend and assistant, Alfred Vail, esq.*

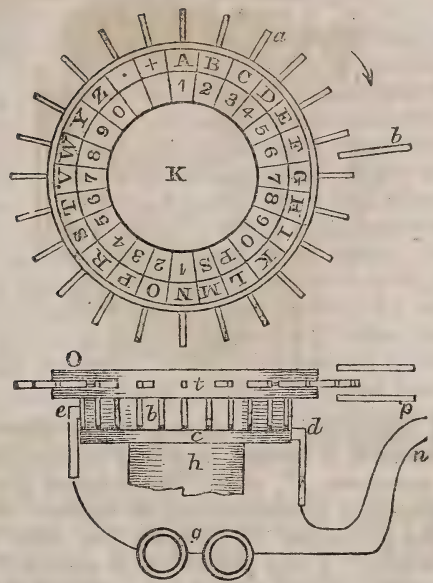
Professor Wheatstone invented his first telegraph in 1837. It was an improvement of Baron Shillings's *needle telegraph*, invented in 1833. The *deflection* of the *magnetic needle* is the basis of both. The *attractive power of the electro-magnet*, which is the basis of my printing telegraph invented in 1832, was used by Wheatstone in 1837, simply to release the detent of a common alarum to give notice to the attendant that a communication was about to be made. This magnet was made to act by a special circuit, by means of which a magnetic needle was deflected and closed a circuit with a local battery which charged the magnet. This is the only purpose for which the power of the electro-magnet was used in the telegraph by Professor Wheatstone, until the year 1841. There is no instance of any attempt to record or print characters by means of magnetism previous to my invention.

Wheatstone's Rotating Disc Telegraph, invented in 1841.

Fig. 1 represents that portion of the instrument which belongs to the *transmitting* station, of which K is a circular disc, with the alphabet and numerals marked in two concentric circles upon it; *a* are handles projecting from its rim, one to every letter, by means of which the disc is turned upon its axis, and brought to that position, *b*, required for signalizing a letter. O is a side view of the disc, K; *t* is the rim of the disc, with its holders; *h* is a portion of the axis of the disc, shown as broken off; *c* represents a

* They who are desirous of obtaining an account of most of the telegraphic plans, on the electric principle hitherto devised, will find Mr. Vail's larger work, entitled "*The American Electro-magnetic Telegraph*," a valuable addition to their library.

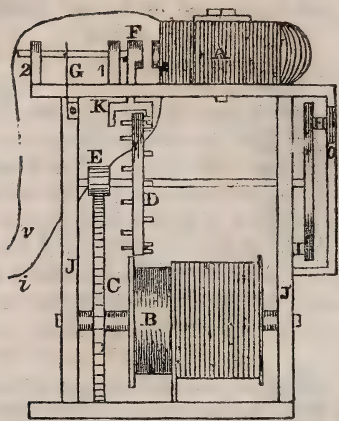
Fig. 1.



silver band surrounding a pulley or hub upon the axis, and directly behind the disc. Upon the hub are metallic ribs *b*, parallel with its axis, corresponding in number to the letters on the dial. Each rib forms a metallic contact with the silver band *c*, and are separated from each other by pieces of ivory fastened to the hub. Both the ribs and ivory pieces are made perfectly smooth and even upon their surface; *e* is a metallic spring, with a portion of it pressed against that portion of the hub between the silver band *c*, and the disc *t*, in a manner that when the disc is turned the metallic ribs and ivory pieces shall alternately come in contact with it. To this spring is soldered a wire connected with one pole of the battery *g*, and from the other pole proceeds the wire *n*: *d* is another metallic spring, similar to *e*, but pressing *only* upon the silver band, with which it is always in contact, and to which a wire, *p*, is soldered. Whenever the spring *e* is in contact with any of the metallic ribs, there is a continuous connexion from *n* to *p*, viz: from *p*, to the spring in contact with the silver band *c*, thence to the rib with which the spring *e* is in contact; then to the spring *e*; then to the battery *g*, and then to the wire *n*. If, however, the disc O should be turned, so that the spring *e* is in contact with the ivory, then the circuit is broken at that point; and in this manner the circuit is alternately broken and closed as the wheel O is turned from one letter to another, by means of the handles at *t*.

Fig. 2 represents a side elevation of the dial and clock work of the *receiving station*. A represents an edge view of the electro-magnet, from which proceed the two wires, *v* and *i*, which connect with the wires *n* and *p*, of figure 1. J and J is the brass frame containing the wheel work, C and E, the pin-wheel D, the dial plate I, and the barrel B, which is driven by a weight and cord. In the side of the wheel D are pins projecting from the rim, parallel with the axis, and are equal in number to the divisions, or letters, upon the dial I. They are, however, placed alternately on each side of the rim. F is the armature of the magnet,

Fig. 2.



fastened upon a horizontal rod, sliding freely through the standards, 1 and 2. G represents a spring, fastened to the frame J, and which carries back the armature, F, when the magnet has ceased to attract it. From the armature there extends downward an arm, K, which, as it approaches the pin-wheel D, presents two arms or pallets—one on each side of the wheel. These pallets are so arranged with regard to the pins, that if one pallet releases a pin on one side of the wheel, the same movement will cause the other pallet on the other side to arrest the motion of the wheel by its striking against the next alternate pin. H and I is an edge view of the circular dial, enclosed in a case, with a single opening at O; so that only one letter at a time can be seen. This dial, I, is in every respect marked as the disc in fig. 1.

Fig. 3.

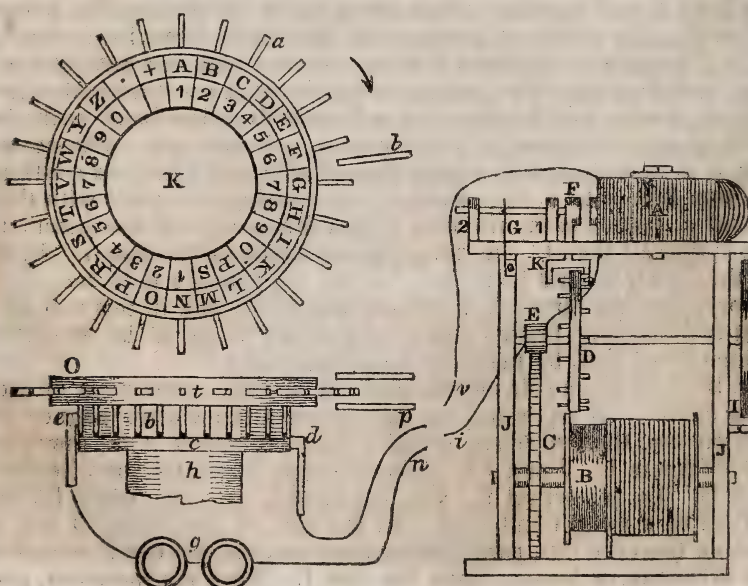


Fig. 3 represents the two instruments—O, the *transmitting* instrument, and the right hand figure the receiving instrument. The wires *v* and *i* are respectively connected with *p* and *n*. It will be observed that the armature F is not attracted, and that the right hand pallet is checking the pin-wheel, so that the dial is stationary. If, however, the disc *t* is turned so that the circuit is completed, by the contact of the spring *e* with one of the ribs, instantly the armature is attracted by the electro-magnet, which will carry the right hand pallet away from the pin-wheel, and which will then move by the action of the weight upon the barrel B, until it is checked by the left hand pallet, which had advanced to the wheel at the same time the other receded. This single operation has moved the disc one division, and the armature is still attracted. Now, let the disc *t* be turned until the spring *e* has been passed by the rib, and is in contact with the ivory only—instantly the current ceases; the armature F recedes from the magnet by the action of the spring G; this has taken the left hand pallet from the pin-wheel, which is permitted to move until the next pin strikes against the right hand pallet. This has now brought another letter in front of the aperture at H. Thus, it will be seen that the design of this instrument is to bring into view, at the aperture, such letters as are required in transmitting a message.

Suppose letter A is at the point *b* of the *disc*, and letter A of the *dial* is opposite the opening. The instrument is now ready to transmit; and let the letter I be the first of the message. The operator gently turns the disc round in the direction of the arrow, so that each time the circuit is broken a new letter appears at the dial, and each time it is closed by the operation of the pallets, in checking and releasing the pin-wheel.

This is its operation until the letter I has reached the point *b*, when a short pause is made. The next letter, H, requires but one movement of the disc, then follows A, then V, then E.

In relation to this instrument, Professor Daniell says: "We can only further briefly allude to two of the most important modifications of this invention, which Professor Wheatstone has made for specific purposes. By substituting for the paper disc, on the circumference of which the letters are printed, a thin disc of brass, cut from the circumference to the centre so as to form 24 springs, on the extremities of which types or punches are placed, and adding a mechanism, the detent of which, acted on by an electro-magnet, causes a hammer to strike the punch against a cylinder, round which are rolled alternately several sheets of white paper and of the blackened paper used in the manifold writing apparatus, he has been enabled to obtain, without presenting any resistance to the type wheel, several distinct printed copies at the same time, of the message transmitted."*

This invention of Professor Wheatstone I critically examined in September and November last, (1845,) at the Nine Elms and at the Paddington station, London, and also at Amsterdam, in October. At Paddington, I gave a name of 19 letters to be transmitted, and requested specially that it should be sent and returned as speedily as possible, as I wished to test the number of letters that could be shown in a minute. The result was, that the name (after several failures to spell it right, and giving sometimes the letter before and sometimes the letter after the true letter in the alpha-

---

* Daniell's Introduction to Chemical Philosophy, page 580, 2d edition: London, 1843.

betic arrangement in the disc) was completed in one minute and a quarter. I inquired how many could be shown in a minute, and learned that ordinarily 15 or 16 letters, although 20, and even 24, had been recognised. This rate was corroborated at the Amsterdam station of the Harlaem and Amsterdam line, on which Wheatstone's disc telegraph is used. 15 or 16 letters per minute was the usual rate of transmission; but I found here, as at Paddington, that the disc did not rotate with correctness; often giving the wrong letter, so that the word was generally guessed at, and frequently required repetition. In this arrangement it will be observed that Professor Wheatstone uses but one circuit.

In Paris, in the latter part of October and beginning of November, 1845, I examined the telegraphic system in operation upon the experimental line, made by order of the government between Paris and Rouen, a distance of 85 miles. This system is an ingenious application of a rachet-wheel escapement, acted upon by an electro-magnet, to the movement of two arms, imitating the configurations of the aerial telegraph already in use in France.

The following is a concise description:

Fig. 1

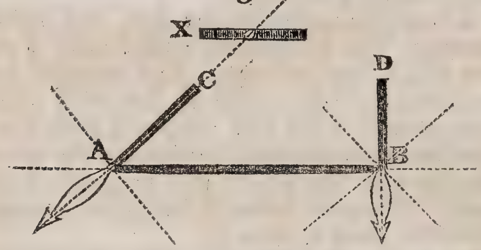


Fig. 1 represents the face of the telegraphic instrument; A B is a fixed dark line upon the face or dial plate; X is an arm having one motion on its centre in the direction of the dots; A C and B D are movable arms, turning on the pivots A and B respectively. The dotted lines are the various positions which each arm can assume, making, by their combined movements, 128 different configurations. The hand X, when horizontal, indicates that the sign is to be read horizontally; when inclined in the direction of the dots, the sign is to be read perpendicularly. This telegraph is operated by two circuits, one for the movement of each arm, the axles of which pass through the pivots A and B respectively; behind the dial and upon this axle is a rachet or escapement wheel of 8 cogs. The cogs of this wheel, connected with a clock train of wheels, are released by the power of the electro-magnet operating upon a lever. At every release of a cog, by the action of the magnet the arm takes a new position, assuming for an instant each intermediate position until it comes to the one desired, when it stops. A single connexion and break of the circuit releases one cog.

With this arrangement M. Brequet states that 10 configurations or signs can be given in a minute. In a note, however, from Mr. Fox, the accomplished administrator of the telegraphs of France, he informs that 28 have been given in a minute; but ordinarily it can only give 10 or 12, and *this* (it will be perceived) requires 2 circuits; consequently it gives at the

rate of 6 signs ordinarily, or at the utmost 14 per minute, for a single circuit.

It will be sufficient to state that by my system I give, with a single circuit, at least 60 characters in a minute; not merely shown temporarily, but recorded in a permanent manner upon paper, to be read at any time.

The efficiency of the three systems will stand thus represented in figures:

The American system, 60 per minute;
The English system, 15 per minute;
The French system, 6, or at most 14 per minute;

with the advantages in favor of the American, that the characters are made permanent and the operation of the instrument surer, the simplicity of the machinery rendering it less liable to be deranged by atmospheric changes or other accidents.

With sincere respect, sir, your most obedient servant,

SAML. F. B. MORSE.

Hon. Mr. Burke,
Commissioner of Patents, &c.

J.—*Tabular estimate of the crops for* 1845.

No.	State or Territory.	Population in 1840.	Present estimated population.	No. of bushels of wheat.	No. of bushels of barley.	No. of bushels of oats.	No. of bushels of rye.	No. of bushels of buckwheat.	No. of bushels of Indian corn.
1	Maine - - - -	501,973	575,500	502,000	273,000	1,564,000	185,000	69,000	1,912,000
2	New Hampshire - -	284,574	291,500	647,000	123,000	1,942,000	425,000	154,000	1,828,000
3	Massachusetts - - -	737,699	817,000	241,000	162,000	1,856,000	594,000	126,000	3,098,000
4	Rhode Island - - -	108,830	120,000	5,000	51,000	200,000	47,000	4,000	731,000
5	Connecticut - - -	309,978	320,000	114,000	26,000	1,646,000	1,010,000	444,000	2,649,000
6	Vermont - - -	291,948	298,000	854,000	51,000	3,593,000	321,000	300,000	1,728,000
7	New York - - -	2,428,921	2,626,000	16,200,000	3,574,000	23,700,000	3,560,000	3,347,000	13,250,000
8	New Jersey - - -	373,306	409,000	1,050,000	8,500	4,912,000	2,954,000	900,000	7,314,000
9	Pennsylvania - - -	1,724,033	1,960,000	12,580,000	141,000	19,826,000	11,929,000	3,322,000	17,126,000
10	Delaware - - -	78,085	79,000	440,000	4,500	828,000	53,000	13,000	2,713,000
11	Maryland - - -	470,019	485,500	4,884,000	2,700	1,691,000	944,000	109,000	3,723,000
12	Virginia - - -	1,239,797	1,255,000	11,895,000	84,600	8,888,000	1,441,000	-	27,272,000
13	North Carolina - -	753,419	760,000	1,969,000	3,600	2,673,000	217,000	-	14,887,000
14	South Carolina - -	594,398	600,000	1,168,000	3,600	700,000	48,000	-	8,184,000
15	Georgia - - -	691,392	784,000	1,571,000	11,800	833,000	64,000	-	13,320,000
16	Alabama - - -	590,756	660,000	980,000	7,200	1,527,000	76,000	-	16,650,000
17	Mississippi - - -	375,651	586,000	378,000	1,800	1,189,000	21,000	-	2,167,000
18	Louisiana - - -	352,411	440,000	-	-	-	2,000	-	8,360,000
19	Tennessee - - -	829,210	910,000	8,340,000	5,500	8,625,000	384,000	26,000	70,265,000
20	Kentucky - - -	779,828	835,000	4,769,000	15,400	13,091,000	2,548,000	14,000	54,625,000
21	Ohio - - - -	1,519,467	1,760,000	13,572,000	219,600	24,447,000	798,000	950,000	57,600,000
22	Indiana - - -	685,866	860,000	7,044,000	35,200	13,902,000	221,000	73,000	30,625,000
23	Illinois - - -	476,183	722,000	4,563,000	101,200	12,957,000	143,000	99,000	25,584,000
24	Missouri - - -	383,102	540,000	1,525,000	11,000	5,466,000	81,000	19,000	15,625,000
25	Arkansas - - -	97,574	140,000	2,427,000	900	436,000	12,000	-	8,250,000
26	Michigan - - -	212,267	320,000	7,061,000	197,200	4,815,000	77,000	260,000	4,945,000
27	Florida - - -	54,477	80,000	-	-	8,000	-	-	733,000
28	Wisconsin Territory - -	30,945	100,000	971,000	20,000	1,200,000	5,000	25,000	672,000
29	Iowa Territory - -	43,112	115,000	793,000	25,000	681,000	8,000	14,000	2,028,000
30	District of Columbia - -	43,712	54,000	15,000	-	12,000	7,000	-	35,000
31	Texas - - - -	-	100,000						
		17,069,453	19,602,500	106,548,000	5,160,600	163,208,000	27,175,000	10,268,000	417,899,000

J—Continued.

No.	State or Territory.	No. of bushels of potatoes.	No. of tons of hay.	No. of tons of flax and hemp.	No. of pounds of tobacco.	No. of pounds of cotton.	No. of pounds of rice.	No. of pounds of silk cocoons.	No. of pounds of sugar.
1	Maine - - - -	8,613,000	1,877,000	-	-	-	-	944	300,000
2	New Hampshire - -	3,714,000	526,000	-	-	-	-	1,210	2,200,000
3	Massachusetts - - -	3,038,000	530,000	-	123,000	-	-	47,110	500,000
4	Rhode Island - - -	650,000	46,000	-	-	-	-	1,250	
5	Connecticut - - -	1,694,000	458,000	-	794,000	-	-	220,000	50,000
6	Vermont - - -	4,926,000	1,139,000	-	-	-	-	13,740	10,000,000
7	New York - - -	21,986,000	3,703,000	-	-	-	-	7,850	14,500,000
8	New Jersey - - -	1,757,000	282,000	-	-	-	-	6,240	
9	Pennsylvania - - -	5,497,000	1,527,000	-	535,000	-	-	41,370	1,600,000
10	Delaware - - -	155,000	19,000	-	-	-	-	5,500	
11	Maryland - - -	705,000	56,000	-	17,920,000	6,000	-	10,240	
12	Virginia - - -	1,899,000	296,000	-	30,218,000	2,412,000	2,500	9,260	1,700,000
13	North Carolina - -	2,711,000	67,000	-	10,373,000	40,000,000	3,000,000	8,850	9,000
14	South Carolina - -	2,520,000	16,000	-	40,000	45,000,000	66,500,000	7,620	30,000
15	Georgia - - -	1,536,000	13,000	-	195,000	205,000,000	14,500,000	8,430	350,000
16	Alabama - - -	1,635,000	15,000	-	341,000	145,000,000	280,000	7,890	12,000
17	Mississippi - - -	3,040,000	1,000	-	193,600	235,000,000	975,000	300	
18	Louisiana - - -	1,299,000	26,000	-	-	185,000,000	3,800,000	1,570	175,000,000
19	Tennessee - - -	2,256,000	42,000	1,500	37,109,000	48,000,000	9,000	30,110	520,000
20	Kentucky - - -	1,508,000	123,000	22,500	63,310,000	1,200,000	17,000	6,970	2,100,000
21	Ohio - - - -	4,120,000	1,251,000	500	7,576,800	-	-	39,370	3,900,000
22	Indiana - - -	2,680,000	1,351,000	500	3,520,000	-	-	1,150	8,000,000
23	Illinois - - -	2,631,000	297,000	500	1,168,000	270,000	-	4,680	600,000
24	Missouri - - -	875,000	77,000	12,500	13,744,000	200,000	-	290	450,000
25	Arkansas - - -	642,000	1,000	-	-	17,000,000	6,500	300	5,000
26	Michigan - - -	4,555,000	214,000	-	-	-	-	1,900	3,000,000
27	Florida - - -	255,000	1,000	-	260,000	12,000,000	675,000	590	750,000
28	Wisconsin Territory - -	938,000	84,000	-	-	-	-	40	300,000
29	Iowa Territory - -	516,000	26,000	-	-	-	-	-	150,000
30	District of Columbia - -	41,000	1,000	-	-	-	-	1,500	
		88,392,000	14,065,000	37,500	187,422,000	936,088,000	89,765,000	486,530	226,026,000

REMARKS ON THE TABULAR ESTIMATE.

In presenting the foregoing tabular estimate, it may be proper, in order to prevent mistake, to repeat what has been stated in the former reports of this office—that no claim is laid to complete accuracy. All that has been attempted has been merely to furnish an approximation, which, although in particulars sometimes rising above, and at others falling short of the actual state of the crops, might still serve, in general, for want of better materials, the purpose of comparison, and form some basis for calculations, in gross, respecting the agricultural resources of our country. To hope to accomplish anything beyond this, with the means at command at present, would be a vain undertaking. Yet it is believed that the grounds on which the estimate is made, with a readiness at all times to correct errors, and an increasing preparation of experience in the use of the materials, will aid essentially in giving more reliable accuracy. Those who will candidly review the history of the crops, as it has been collated from notices made on the spot, and mark the causes at work to affect them, it is presumed will admit, for the most part, the justness of our conclusions; and to such it is unnecessary to state the extreme difficulty of arriving at an estimate which will satisfy those who choose some easier method of decision. Various methods have been proposed for reaching the desired object; but, in the absence of an actual census, no better mode than the employment of similar data, yet more extensively gathered and perfected by comparisons, appears to us practicable.

Some writers in the public journals seem to place great reliance on the amount of wheat brought to the Atlantic ports, and claim that this is the truest test of the increase or decrease of the crop. While we admit that this is an important element of computation, and as such is ever regarded in our estimate, it is doubted, however, if this alone is sufficient. The comparative decrease or increase of the other crops in the place where such product is raised, may often exercise an important influence to modify such a calculation. If one product, on which reliance has been placed for feeding the stock, has been cut off, resort must be had to another; and the degree of such consumption may thus very essentially vary the surplus left for the market; so that, though the amount of wheat raised in the western States may be actually greater or less, as the case may be, the amount brought to the Atlantic ports may be less or greater, according to a variety of other circumstances irrespective of production. The demand in the way of trade, therefore, is only one of the many things to be considered. The greater previous stock remaining; the greater ease of placing the surplus of any year in market; the kind of payment received; the ease and expense of preparation for use at any given period, with a variety of other circumstances, must tend not a little to modify the amount received at the nearest place of exit, or at the remoter markets. So that the amount passing any lines of transportation, or entered at any office, will not by itself give the correct data for an approximation to an accurate estimate.

In using the various elements on which estimates are made, reference must likewise be had to the ability, from experience or means of observation, of the informant, his freedom from bias, and the absence or presence of extraneous causes which may operate to influence his judgment. It is obvious, therefore, that it is no easy matter to sift out and discriminate the true from the false, and thus form, by a series of deductions, a result which may have

some pretensions to be regarded as founded on correct principles of judgment. Such means, however, as are within our reach, have been resorted to, and, with all necessary deductions, they have been employed to secure, as far as practicable, a candid view of the whole state of the case.

The amount of materials collected during the past year exceeds that of any former year; though we still have to regret, that, on account of no answers to some of the circulars for information, the means for estimate in some sections is less complete than it might otherwise have been. A greater number of the public journals and agricultural papers, both at home and abroad, have been carefully examined, and such information as they contained collated and arranged in such a manner as to form a history of the crops through the season. The advantage of this plan is apparent, as it enables any one to judge, from one period to another, of the causes influencing the staple crops of the country, and affords, in some degree, a criterion by which to arrive at the more correct conclusion as to the amount raised.

In consequence of a census of population in four States, we have been enabled to correct our table of estimated population. These are New York, Michigan, Illinois, and Georgia. In New York, directions were likewise given to the marshals to collect the amount of the principal crops raised during the preceding year. These statistics have been procured from the office of the secretary of the State of New York, and have been made the basis of our estimate for the year 1845. The same has been done, so far as any such data could be obtained, in the case of the other States.

The disinclination of many to communicate the amount of the products of their industry on such occasions, induces a belief that such an estimate will oftener be found to fall below than to exceed the actual amount of the crops so raised. Allowing this cause to operate to some degree, it would tend to approximate our former estimate considerably nearer to the statistics reported on such official authority.

In most cases it has been deemed advisable to give only the round numbers, leaving the fractional parts. This cause sufficiently shows the comparative product, and is as likely as any other to be accurate.

The progress of agricultural knowledge is steadily onward. States are turning with deeper interest to providing means for encouraging the farmers and planters in their respective limits; surveys of the soil and various products are set on foot; and thus, much valuable information is elicited. Men of science are devoting themselves to the illustration of the principles of agriculture, as a science founded on careful experiment. New journals are every year established, and numerous volumes published, designed to convey to the husbandman, planter, and grazier, the orchardist and the dairyman, the results of investigations at home and abroad. Agricultural societies and farmers' clubs are greatly on the increase; and the numbers who attend their exhibitions, and take a part in their deliberations, shows the deeper interest which is every where awakened in securing the benefit of these auxiliaries, to the correct and profitable arrangement and development of the agricultural industry of the country.

Some advances are likewise making towards the introduction of this science as a subject of common school education and instruction in primary schools, as well as in the establishing of institutions more expressly designed for this particular purpose. No subject is receiving more earnest attention, in all the various periodicals and volumes adapted to the

agricultural class, than is that of manures; and the applications of chemical and geological science to this object are daily becoming more important and useful.

New enterprise, too, has recently been directed towards the improvement of stock, by the importation and crossing of breeds, and particular care to note their adaptation to the different sections of the country.

Every year introduces, likewise, to the agriculturist, some additional implement by which his labor is lessened, or better done; and, while he is thus saved somewhat of the sweat of his brow, he is likewise assured of greater profit from the fruits of his industry. There is, thus, mutual dependence as to the pursuits of the farmer and those of the artisan. Mechanical industry presents him with the results of her inventive genius. With these in hand he forces from the earth her increase, and, by the blessing of a kind Providence, is enabled to pour out to the community around him a lavish of nature's bounties, such as no other country can so universally boast. In view of his own improved tools and means of culture, he may well wonder how his fathers, and even himself, formerly, could have been satisfied with the ruder ones which have been so long in use. We are, however, but at the commencement of these better things.

The researches of each successive year, and the multiplied facilities added to the train of conveniences enjoyed, authorize the belief that the advancement of agricultural industry is destined far to exceed any that has yet been seen.

There is no want of adaptation of soil, or of fertility, or of means of industry, or of bone and sinew of free yeomanry, who may enjoy the fruits of their own labor; and, as an increasing population spreads far and wide over the whole face of the land, its abundance, under the smiles of Heaven, will ever suffice for both the native born and for the emigrant, who, from foreign shores, seeks an asylum from the oppression which starves him and grinds him to the dust.

Even the evils which attend the greater or less failure of some important crop, as in the present year has, to some extent, been the case with the potato crop, are not without their good effects; insomuch as they will call forth scientific investigation, observation, and practical industry, to determine and apply the remedy, and thus often throw new light on the true theory of germination or progress. More care will probably be taken in selecting seed, in cultivating the soil, and in storing the crop; new varieties may be secured; and the still greater failures, which might otherwise have taken place, thus be prevented. Some of these observations, in general, will receive yet fuller illustration in the future consideration of the specific crops as they come under our review.

We are not, too, without our resources even in the case of the more permanent unproductiveness of some particular crop. The history of our country, and the wide extent and variety of soil and climate, enable us to turn our attention from one thus failing to another, and in many cases new products may thus become introduced and acclimated among us. To any one who may live a half century hence, the comparison in this respect may be a striking one. Fields blooming with some plant now scarcely known may then frequently meet the eye, and afford promise of a rich harvest to repay the enterprise and skill devoted to its culture; and the octogenarian of those days may possibly find, but few and far between,

the patches of some fruit of the earth, which he was wont in his boyhood to see, frequently wide spread over his native soil.

As commerce and enterprise open to us the vast empire of China, and the interior of South America, it would not be surprising if there should be discovered there products well adapted to sections of our own country, but which are as yet unknown among us. It should, therefore, be an object to keep a lookout for every thing which may tend to benefit the agricultural industry of our country; and even if the boon is gained by the price of numerous fruitless experiments, yet success may often reward diligence and patient effort to accomplish the end.

By a reference to the report of the Commissioner of Public Lands, we learn that 1,754,763 acres have been sold during the past year. Now, although we can by no means assume that all of this, or even the greater portion of it, goes under cultivation at once, it still must be supposed that a part of it must add to the amount devoted to agricultural supply in the States where it is located; and this item deserves notice in forming our estimate of its products.

The same may be said with respect to the amount of increased population from emigration. The number of emigrants from Great Britain and European countries generally, to the United States, is believed to have been greater during the past year than in the previous one, when it amounted to from 80 to 100,000; a portion of these, no doubt, engage in agricultural pursuits, and thus have some influence, not only on the consumption, but also the production of the crops.

THE SEASON.

Some persons reading the former reports may have thought the few pages devoted to extracts from the various public journals relating to the weather is of little or no use; but we do not thus view the matter. On the contrary, we believe that there are advantages in taking even the partial information just as it is given, and presenting it to the public from year to year, that they may judge of the variations to which the different crops are subjected, and the consequences which have thus resulted. We have therefore watched with increased attention the indications of the season, as noticed in the public papers. These, though in most respects too defective for any extended generalization, yet aid somewhat in the conclusions formed respecting the crops.

It is obvious that a favorable planting season, or the state of the soil, as previously affected by the various changes of the weather, must have some influence on the productiveness of the crop, allowing the usual season of growth to have been enjoyed. Every year exhibits greater or less degrees of cold or heat in the various sections of our vast country; and ranging, as it does, from latitude 25° to 49° N., not including Oregon, which reaches to 54° 40′, embracing seaboard and inland, mountain and plain—intersected by numerous rivers, and overspread in many parts with forests in all their native wildness and vastness of growth—the diversities of season must, of necessity, be numerous, and their effects deserve serious consideration. As the seed time or growing period, or harvest, must vary by weeks, and in some cases months, it is obvious that, were there a general prevalence of some particular temperature or accidents of climate, the effect will often be found to be different, if not wholly opposite, even

in the several sections where such a cause exists. The same remark applies to the nature of the crops. A season highly favorable to one kind of production may be injurious to another. The same extended rain which is needed, and therefore highly beneficial, in one part of the country, may be less adapted to another in a different condition, in relation to the similar or diverse crop, as the case may be. The weather, for instance—to take up the subject in a somewhat different point of view—which may be most suitable at some period to a young growth of cane or of cotton, may be unfavorable to another kind of crop, as that of corn or of potatoes.

The season of sowing or planting, from one extreme point to another, probably reaches over two months or ten weeks. A rain, therefore, which might benefit a crop already in the ground, or injure it, might exert a very disastrous or favorable influence on some other, according to the previous condition in preparing the soil for the seed of some other product yet to be deposited therein.

We have gathered a large collection of notices respecting both the cold and heat, from April and on, in various parts of the country; of course, we shall have room for but a few quotations; but it is evident that there have been unusual variations of temperature during the past season. Late frosts are spoken of in the early part of the season—even in the southern sections of our country, where they are less to be expected than in the northern States. In connexion with these, also, we meet with very frequent complaints and lamentations on account of the want of rain.

In the month of April the drought is stated to have been unusually severe in some of the southern States. This seems to have been peculiarly the case in South Carolina and Georgia. Thus the Winyah Observer remarks: "The season continues very inauspicious for the planters in this neighborhood. April is rapidly passing away, without having given the showers common to the month. The tributary streams continue low, and the river is salt up to town. Several planters are using brackish or salt water to get up the rice crop; and those who plant in open trenches, without covering, are annoyed by the May birds. The corn and potato crops are suffering from the general drought."

Again: the Greenville Mountaineer, of April 25th, has the following notice:

"*Continued drought.*—Another week has passed without sufficient rain to lay the dust. The wheat and oat crops are very much injured, and in some fields entirely cut off. The corn and cotton seed that has been planted in many places cannot come up. The drought seems to extend throughout the whole United States, with the exception of light and partial showers in some sections."

Again: we learn from the Savannah Republican of April 30th, that "in Madison, Georgia, no rain of any consequence has fallen in four weeks. With the exception of one or two very slight showers, the deprivation at Savannah has been longer. Many of the planters are a month behind their prospects of last year at this period."

The Savannah Sentinel, in the early part of May, says: "We do not recollect ever to have seen so dry a spring as this has been. We have not had any rain of consequence since the 3d of February last; and the month of April, so famous for rain, has passed off with only five slight

showers during the whole month. The consequence of this drought has been serious injury to vegetation of every description in this section."

And, in the same public journal, about the same time, we find the following statement:

"*The drought.*—The almost unprecedented drought here, at this season, has extended far and wide, though we hope soon to terminate, as heavy rains (mostly with hail) have fallen recently in isolated places."

The Little Georgian (Forsyth) of the 2d instant says: "We have never witnessed a drought so extensive or so long in duration as the present at this season of the year. In a recent jaunt of some 130 miles, we saw only three districts, of very small extent, where there had been a rain in less than six or seven weeks. Wheat and oats, previously unpromising, are in many places almost entirely ruined, and vegetation of all kinds suffers severely."

Under the date of Macon, Georgia, May 5, it is said: "The severe and destructive drought still continues, enhancing the value of small grain and destroying the prospect for a cotton crop. Much of the cotton seed planted remains in the ground, without a possibility of vegetating until we have rain. The prospect for the season is by far the worst I have ever seen. Many of the young plants have withered from heat; and if this state of things continues ten days longer, every paper from Georgia to Memphis, Tennessee, will be heralding forth short crops."

Similar complaints are observed from St. Augustine, under date of 6th of May: "We want rain. Our corn and tobacco crops are suffering severely."

Drought, too, was experienced in Virginia early in the spring.

The Lynchburg Virginian has the following paragraph, about 20th of April:

"*The season.*—It has been now upwards of five weeks since we have had rain enough to wet the surface of the earth; a most extraordinary (and the 'oldest inhabitant' thinks unprecedented) circumstance, in this proverbially 'showery' month. During almost the entire period, too, the weather has been cool, and sometimes wintry cold. The consequence has been the entire loss of every variety of fruit, and extensive injury to the tobacco plants and to the early wheat, much of the latter being apparently destroyed."

Nor was this drought confined to these States. In other sections of the country we notice similar statements, in some instances coupled with complaints of cold and frosts. Thus, the Syracuse Journal of May 14th, in the interior of the State of New York, has the following notice:

"*The weather.*—Since the showers of the 25th ult. we have been entirely without rain until yesterday, when there was a refreshing sprinkling, and the appearance of more to follow as we were going to press.

"The drought has had an unfavorable effect upon vegetation, though a soaking rain would doubtless start every thing forward again like magic."

Again: the Wheeling Times, under date of April, says:

"The weather continues dry, with no appearance of rain. It also continues cold, especially at night. We learn that there is danger of the wheat crop, especially on the hills. The ground is too hard to work."

So, in Missouri, there is mention of great want of rain during April and the early part of May.

The Paris (Missouri) Mercury of 19th May says:

"Never have we seen here so gloomy a prospect for an abundant crop. There has not been rain enough to lay the dust for a month. Seed which has been put in the ground cannot vegetate, unless it should rain.

"Wheat is dry to its roots. We hear complaints relative to tobacco plants to pitch a crop, and fears are entertained on this subject. We would advise farmers to sow tobacco seed again, although late in the season."

The cold and frosts also were unusually late in the spring and the opening summer, and frequent notices have been gathered expressing apprehensions from this cause.

Snow is mentioned about the middle of May in Maine; in Boston, Providence, Greenfield, and other places in New England, we find statements of severe cold, frosts, ice, &c., which injured the fruit and vegetables in May, and even in June. The same was the case in the State of New York.

We quote a few notices as specimens of numerous others which might be mentioned:

"*The late frosts.*—The recent frosts have been very destructive to apples and peaches in several counties in western New York. The corn crop is not far enough advanced to be much injured by this untimely freezing. The weather is still cold, (May 20th;) anything but favorable to summer crops. Wheat generally looks well."

"There was a heavy frost on Wednesday, Thursday, and Friday nights, which did serious damage to nearly all sorts of vegetation in this region. Fruit, to a great extent, is destroyed; corn and potatoes were nipped to the surface of the ground; while beans, pumpkins, cucumbers, and many vegetables, were completely killed. Snow fell on Friday."—*Le Roy Gazette, June* 4.

"There was a severe frost in this vicinity on Thursday night last, which effectually 'used up' corn, beans, tomatoes, and almost everything else which frost could affect; gardens are almost entirely destroyed."—*Livingston Republican, June* 3.

"We had a frost on Thursday night last that used up everything in the fruit line that had previously escaped."—*Cattaraugus Whig, June* 3.

"Further damage was done to the gardens in this vicinity by the severe frost of Thursday and Friday nights. All kinds of vines, and some varieties of garden vegetables, that were not protected, were greatly injured or entirely destroyed. Corn is almost cut down, but it is thought it will put forth again if the weather should prove favorable. Wheat looks tolerably well, but we judge there will be less than an average crop in this quarter."—*Ontario Repository, June* 4.

"One or two nights of last week this village and vicinity were visited by a severe frost; corn is materially injured, and fruit of all kinds is pretty generally killed."—*Batavia Advertiser, June* 3.

"We can scarcely recollect a season when the changes have been so sudden and remarkable. On Thursday night of last week ice was made of the thickness of almost half an inch, and so cold was it that the ground was even frozen. Fruit is entirely cut off in this section, and we learn that the frost reached a good distance north and west."—*Cortland Whig, June* 5.

"We had several snapping frosts last week, the effects of which, we fear, will be felt upon the fruit."—*St. Lawrence Republican, June* 3.

A public journal in New Jersey, during the month of May, has the following: "The farmers complain most vehemently of the cold and backward spring. We have heard those experienced among them declare that they remember nothing like it during the last fifteen or twenty years. What is the philosophical reason?"—*Rahway Republican.*

In the early part of June, also, we find the following statements in different papers quoted from others, to which they are credited:

"The cold weather and frost of last week have nearly cut off the pea crop in New Jersey. The potatoes in the neighborhood of Germantown have also suffered greatly."—*Philadelphia Gazette.*

"We have just had three severe frosts. The wheat appears to be in full bloom. No doubt the bloom is killed by the frost, and that the heads will be deprived of germination. Therefore, what we call in this country the wheat heads will be dropped. More than half will be destroyed should the germination be stopped on what is now in bloom."—*Baltimore Patriot.*

"*Ice.*—There was ice made upon the edges of the ponds and ditches in the vicinity of Wilmington, Delaware, on Saturday morning last. It is supposed the tender vines would be destroyed by this cold; the corn, too, has suffered, but the grain will recover."—*N. Y. Express.*

In Alabama, in the latter part of April, there are similar complaints respecting the cold, backward season, and even frost. Thus the Montgomery Advertiser says:

"*The season.*—During the present week we have had a return of cold weather, with slight frost, which, in connexion with the previous spell of cold, will retard the season considerably. How the fruit generally may be affected we can hardly say, though we think, where it has been exposed to the influence of northwest winds, unsheltered by woods or houses, that it will be considerably affected in quantity, at least, if not in quality. The cold nights of this week must have checked the cotton, if not otherwise injured it, in low, moist situations, and will make the season somewhat later than that of last year."

From a large number of similar notices respecting the frosts and cold in the latter part of spring, at the west, we give only the following for the month of May, or June:

"*The weather in Cincinnati.*—We have had very cool winds and frosts for several nights past. The storms west of us, we suppose, have caused this change. Fires in the evening are not uncomfortable, and most persons are still winter clad. We are informed that on the hills north of the city on Wednesday night the frost was very severe, and that it destroyed many of the garden vegetables. Peas escaped; the tomatoes uncovered are swept."

[From the Cincinnati Gazette of 6th June.

We learn from a friend who has just crossed the State from Toledo to this city, that the appearance of the country north of the national road, and in some instances this side of it, is desolate in the extreme. What the long drought had left of vegetation, recent frosts have taken off. All that has appeared in the newspapers, within two or three weeks, concerning the destruction of crops, he saw verified. At Toledo, on Thursday night last, ice froze to the thickness of three-eighths of an inch."

Cold weather.—The State Journal at Columbus, Ohio, says: "The

weather has been unusually cold for the month of May, in this section of country. On Monday night and last night, (Wednesday,) the 5th and 7th instant, sharp frosts were experienced. Ice was formed at night, and stood until after sunrise on Tuesday and Thursday mornings. The tender vegetables are mostly destroyed. The corn has been nipped, and will be thrown back."

The Cincinnati Gazette of 4th June, speaking of the severe frosts of the latter part of May, says: "At Toledo, on the 29th of May, ice froze to the thickness of three-eighths of an inch, and the appearance of the country north of the national road is represented as desolate in the extreme."

"*Severe frosts.*—On Wednesday night last, May 7, our country was visited by a severe frost—so much so, that most all of the early vegetation was nipped to the ground. The early cornfields will be retarded at least three weeks; potato tops have been cut off, and serious apprehensions are entertained for the balance of the fruit crop—peaches, apples, grapes, &c."—*Terre Haute (Indiana) Express, May* 14.

"We had severe frost on Wednesday night last, which completely destroyed everything in the gardens that could be affected, and cut down the early corn in the fields."—*Connellsville (Indiana) Telegraph, May* 9.

"*Frost.*—Very serious injury was done to the gardens in this neighborhood by frost on Thursday night. The corn was also touched, but not so seriously that it may not recover from it."—*St. Louis Republican, May* 17.

The public journals during the months of June, July, and August, in very many sections of the country, were filled with lamentations on account of the distressing drought which prevailed. The heat rose to very high degrees in the thermometer. Thus, in the agricultural report for July, in the vicinity of New York, it is stated: "The month of July has been one of the dryest we have ever known. The earth has been so parched up that not only vegetation has suffered seriously, but even the trees show a want of moisture." And, speaking of August, it is said:

"The earth was parched to such a degree that there were great fears that every description of vegetation would be destroyed." So, in an Albany paper: "The drought is intense; the fields are almost baked with the heat, and the failing of springs and wells gives evidence how deeply the heat has struck in the ground. A few days more of burning weather will ruin the corn past recovery."

Partial showers relieved parts of the State, while others still continued to suffer from the great severity of the drought through the month of August. Thus, a public journal at Hudson says:

"While we have gratifying accounts of plentiful rains around us in almost every direction, we are still without any except a slight shower or so, and we understand that the same is the case in Dutchess and a portion of Ulster counties. The season throughout the whole country has been a remarkably dry one; but we believe no part has suffered to the same extent that we have here. Vegetation of almost every species is literally burnt up. A speedy rain might save our turnips and late sown buckwheat; but the corn, hay, oats, potatoes, &c., are little better than nothing. Again: A gentleman who left Syracuse on Thursday morning says there had been very little rain there for more than a month. Vege-

tation was suffering." Still further to the west in this State the same accounts meet us, thus:

"BUFFALO, *August* 1, 1845.

"The dry weather, which promised so much injury in June, has amply fulfilled all its promises. July has been one of the hottest and dryest months on record. The highest range of the thermometer was 104° in the shade on the north side of our farm-house in the country at 1 o'clock, p. m. The hot Sunday it marked only 98°. The Wednesday following, at the same hour, and in the same place, it marked 104°. The ground is literally dried up. The streams and springs have been lower in this month than I have seen them before since I have been a resident of this region, and that is some thirty-five years. The pastures looked as arid as a desert, and wherever fire was set, it run over them as over a stubble. It has been a very gloomy month for the farmers. All kinds of crops have suffered, but some more than others."

The same was the case in Pennsylvania and Maryland. We might quote pages of notices of the drought from June to August in the south.

The following are some of the statements which were made in the public journals in Virginia and the southern States:

The Washington Union says, in the month of July—

"*The drought.*—There has been a general complaint about the late oppressive hot spell of weather. Every one seems to think that it has reached the superlative degree; and whether he was in the city or the country, the south or the north, that it was the hottest spell he had ever experienced. To-day, however, we had a cooler and much more agreeable temperature. The excessive heat has been accompanied with an oppressive drought, which has withered the grass of our squares, and has been most lamentably felt throughout the country. The last Richmond Enquirer, speaking of the great tobacco growing county of Halifax, says: 'Much gloom hangs over that region of country in consequence of the crops being blasted by the scorching sun and alarming drought. Indeed, in every quarter, we hear melancholy complaints of the want of rain.'

"A farmer in Goochland told us that he had to send so far to mill that he thought he should send to Richmond, forty miles off, to supply his farm with meal; and, in North Carolina, we observe they send ninety miles, to Petersburg, to get their meal. We fear much distress and sickness will follow this extraordinary drought. On Saturday and Sunday we were tantalized by a prospect of showers, but in vain. Yesterday the heat was oppressive as ever, though we are glad to have to record no death from the immediate action of the sun, which, in the north, according to the papers from that section, has carried off so many suddenly to the grave."

The Lynchburg Virginian says, that of universality as well as duration the drought is almost unprecedented in the memory of the present generation.

A letter from Charlotte, N. C., of 5th July, says the earth has not been thoroughly wet since 3d February, and there had been no rain there for seven weeks.

The Charleston Courier thus quotes a letter of the 14th of June, from Fairfield district—

"Over my parched and naked fields drought has reigned, and does reign, supreme. My once verdant fields of small grain have withered and

died under the ravages of the chinch bug; my dwarfish and sickly corn is threatened with annihilation from the same cause; my pastures are ash-beds; my water courses sand beds, and my cotton barely rears its puny head above the scorched earth. When employed at my business, devastated oat fields, blighted corn, and stinted cotton, sicken my heart. When I stroll to uncultivated fields, famished hogs and staggering cattle are my comforters. Clouds pass over, thunder rolls, but all ends in mockery. Hope has been deferred till I have lost all acquaintance with it. It would seem inevitable that I must not only fail to make my bread, but that the whole country around must share my fate."

And in July, the Anderson Gazette, published in the same State, says—"This has been, thus far, the most remarkable season we ever knew; in many parts of this district the ground has not been wet since March, and the cherished hopes of many farmers are almost entirely blasted."

The Pendleton Messenger makes similar complaint; and, indeed, from almost every district of that State we hear of a most extensive and alarming drought. Again:

"*Dry weather.*—We have been informed that copious showers have recently fallen in some sections of the district; but, in this neighborhood, and throughout the country generally, the drought has continued, and the temperature has been that of summer heat. The crops in the fields and gardens have suffered considerably. We have not had any rain of consequence since the 13th of March last."—*Edgefield (S. C.) Advertiser, August.*

The same state of things prevailed in Georgia, as the following notices abundantly testify:

"*Great drought.*—Rain is wanted far and wide in this region of country. The Milledgeville Recorder says: 'We are greatly suffering for want of rain. And where are they not? It seems to us, from all we can see, that the whole country is parched. Dry as we are here, we understand we are not in as bad condition in this respect as other regions are, and this extending very much through Carolina, Alabama, &c. The Oconee, at this point, is said by our old citizens to be lower than it has been for the last forty years.'"—*Savannah Georgian, June* 12.

"*The weather.*—From almost every direction we hear complaints of dry weather and intense heat, and we regret to add that Athens is not an exception to the general rule. In nearly all this region, the crops are suffering for want of rain. During the last week the weather has been hotter than we have known it for years. The thermometer has reached ninety degrees for several days in succession, and once or twice has been up to ninety-four."—*Athens (Ga.) Banner, 24th June.*

"*Remarkable drought in Georgia.*—In Upson, Crawford, Pike, Monroe, Butts, Henry, and Fayette, no rain of consequence has fallen since early in March; and we have been assured by gentlemen from these counties that in no part of the State, since 1818, has any drought been more blasting, or prospect of the corn crop worse, than at present in these counties."—*Macon Telegraph, July.*

The weather.—The Fort Gaines Whig of the 7th June, says: "The drought still continues, with the exception of a few slight showers, scarcely sufficient to moisten the parched earth. No rain has fallen in this neighborhood since the middle of March. We are informed by planters that the corn crop is much injured, and will fail entirely if the drought

endures much longer. In many places it is but from knee to breast high, and already in tassel and silk. The Chattahoochee is lower than it has been known to be for many years. The steamboat Columbus, however, with great difficulty, and much to our surprise, reached here on Tuesday last from below, stored her freight, and returned to the bay."

In Alabama and Florida, also, the same complaints are numerous.

The drought in Alabama.—The Montgomery Advertiser of the 4th July says: "One of the severest droughts which has ever been experienced now prevails in this section of Alabama. On very many plantations the corn crop is nearly destroyed. Rain even now cannot restore it. Cotton in many places is seriously injured; and, unless we have rain soon, a short crop may be expected. As to gardens, especially in this vicinity, most of them are entirely burnt up.

"In Alabama, too, the drought extensively prevails. The Cahawba Gazette, July 2, says: 'A general drought seems to pervade the whole country. The corn crop is a total loss in many places—rain cannot save it.' The Marion Review states that 'vegetation is withered—dried; literally dried, like hay. We have not had, in many places, rain enough to wet the ground since the 1st of May.'"

The drought in Florida.—The Tallahassee Star of the 13th of June says: "This whole region of country is, at present, suffering under one of the most severe and distressing droughts which have been experienced in this climate for many years. Most of our springs, branches, and creeks have failed, and many of the old wells, which have hitherto borne a good character, have suddenly flanked out. Our different kinds of crops are consequently suffering considerably. Gardens, even of the youngest class, have a very old and withered appearance, and many of the usual delicacies of the season, of the vegetable kind, have come missing."

"*The weather, crops, &c.*—Never have we experienced such a continued spell of warm weather in Florida. For several weeks the atmosphere has been very oppressive. The thermometer ranged from 93° to 99°. No rain of any consequence has fallen in the mean time, and what little breeze we have had has been from off the land; hot and dry, like the Sirocco—withering all vegetation. Most of the crops in this vicinity, we fear, will fail. The fruit on the trees appears to be wilting, for the want of a few genial showers. But the city is, as usual, very healthy."—*St. Augustine, (Fa.,) June* 28.

According to the Jacksonville Statesman, the prospects of the planters in that portion of Florida are completely ruined. Every thing is perishing under the excessive heat and drought. The crops are withered to a crisp, the ponds and streams have dried up, and the cattle are dying for want of water.

Under date of July, we learn the following respecting the prospect in Louisiana:

"In Louisiana the drought is severe in some sections. The Baton Rouge Gazette says: 'The drought, for some time past, has dried up the corn and sugar cane. However, last week some parts of the parish were visited with showers highly beneficial to those in the favored range. On some plantations one half received repeated showers, while the other half is withering for want of the same benefit.'"

Nor was the drought confined to the Atlantic coast; it prevailed exten-

sively at the west; and even in August we meet with notices like the following:

The drought.—The Detroit Advertiser says: "This vicinity has, for some time, been suffering severely from the dry weather. The ground is perfectly parched. Grass and all growing crops are nearly dead from thirst. The prospect for fall feed and winter fodder is especially gloomy. The skies yesterday gave some promise of a shower, at least; but all signs fail in dry times. The weather is, also, oppressively hot; it has scarcely been more so during the summer."

Various statements are found in the public journals which show the extreme heat which prevailed, especially in the month of July, by which it appears that for days in succession the thermometer ranged from 87° up to 95°, and even 102° or 104°. The quantity of rain which fell, according to meteorological journals published, was unusually small.

We quote the following, as it presents a fair specimen of many other notices which might be given:

"The weather during the last week has been excessively hot and oppressive—beyond all former record—not only in this city, but also at different places from which we have heard. The range of the thermometer in the shade was, at Savannah, Georgia, from June 10th till the 24th, never below 90°. On the 23d and 24th it stood at 102°.

"In Charleston,	July 10,	94°
Boston,	12,	101
Rochester,	12,	97
New York,	12,	94
Philadelphia,	13,	101
New York,	13,	99
Albany,	13,	98
Brooklyn,	13,	95
Baltimore,	13,	95
Hartford,	13,	91
New York,	14,	98
Brooklyn,	14,	96."

From observation at Concord, New Hampshire, we learn, in the Farmers' Monthly Visitor of September 30th—

"From the 3d of July to 21st of August, there did not more than a quarter of an inch of rain, on what would moisten the ground about an inch deep, fall at any one time; the whole amount of rain between the two dates being less than one inch; the whole amount in July and August being about four inches, and three quarters of it fell the first three days of July, and the last week of August."

It is stated in the Genesee Farmer, published at Rochester, New York, that the "total amount of rain in June, July, and August, was 10 inches."

A journal kept at Athens, Georgia, and given in the Southern Cultivator, says: "The total amount of rain for March was 0.70; April, 0.12; May, 1.21; and June, 0.48 inch; for July, 3.60; August, 0.74; September, 0.58."

"In Chicago, from April 26 to May, 1.63; May 26 to June 27, 4.12; from July to August, 2.93; August to September, 1.53."

The quantity of rain noted at Louisville, Kentucky, in July, was 4.34 inches.

The ravages of insects do not seem to have been as great as in some former years; at least, the complaints of them in the public journals, and the notices of the crops furnished, are not so numerous. The army worm is mentioned as troublesome near Raleigh, North Carolina; in Michigan, Ionia county; also, in Wisconsin; and locusts in Missouri and Louisiana; the fly and weevil in some sections of the west, though not to the extent of former years. These will mostly be noticed in their proper place, under the respective crops thus suffering.

The damage by violent storms and tempests has also, it is believed, been less than usual, though occasional notices have met our eye of injury thus sustained.

On an inspection of the tabular estimate, it will be seen that wheat is raised in all the States except one—Louisiana. In the census statistics 69 bushels was put down to this State; but, as the amount was so trifling, it has not been deemed advisable to retain it. The amount raised in Rhode Island and Florida is also very small. Of barley it may be said, that though but a minor crop in most States, there are but two, Louisiana and Florida, where it is not numbered among the crops. Oats, Indian corn, potatoes, and hay, are more or less cultivated in every State of the Union; rye, to some extent, in all except in Florida; buckwheat, in twenty; hemp, in five; tobacco, in seventeen; rice, in eleven; silk, in greater or less degree, in nearly all; cotton, in fourteen States; and sugar, also, in almost every one.

In reviewing the crops we shall not adopt any uniform order of arrangement; though, in most cases, we shall be guided, in the form of procedure, by the rank the different States hold in relation to the product under notice, or geographical situation.

WHEAT.

The wheat crop of New York appears to have suffered but little from the extremes of the weather. On comparing the accounts at an early period of the growing season of the sections where the largest quantities are raised, we find them in general quite favorable. Thus as early as March, it is stated of the crop in Livingston county and vicinity, that the wheat looked "remarkably well." We meet with similar statements in April and May in respect to the western section of the State. As a specimen take the following:

"*Wheat* in this quarter is looking tolerably well; though the crop, generally speaking, is not as promising as that of last year."—*Canandaigua Rep.*

"*Wheat a coming.*—A friend showed us yesterday several perfectly formed heads of wheat of this season's growth, which, considering the generally low stage of the thermometer, may be considered a pretty fair development of the coming *wheat* crop."—*Rochester Adv.*

Again, early in June, the Genesee Democrat says that the crops in that vicinity looked "tolerably well." The Syracuse State Journal gives a similar testimony, as does likewise the Onondaga Standard; and the Ontario Repository mentions that the wheat crop was "improving;" and, "with an occasional exception, the fields give promise of a fair yield."

As the harvest advanced, we find under date of Syracuse, July 11—"The fields of wheat within sight are assuming a golden appearance, and in

the course of next week the reapers will commence gathering a most beautiful crop of a clear plump berry. Our opinion, formed by information from those who have abundant means of knowing, is, that the wheat crop of this State the present year will exceed that of last year at least one-quarter, if not one-third. The quantity will not only be larger, but the quality will exceed that of former years." The Newburgh Telegraph says: "Many fields have escaped the ravages of the *weevil*, a fly maggot, while a large number have been partially, and others wholly destroyed." "The wheat crop of Delaware county," it is stated in the Albany Argus, about the same time, "is represented as very fine." In the vicinity of New York it is also considered "very good." "The weather for securing it was for the most part uncommonly favorable."

In the month of August the accounts still continue to be for the most part favorable. Thus the Batavia Times says: "The wheat crop, which is of the most importance, is now secured in good order, and is in general very fair." And under date of Buffalo, August 1st, it is said:

"*Winter wheat.*—This crop has been all secured and in good order. The yield will be more than an average. But the total quantity raised will not be equal to the crop raised in 1839, which was *the crop.* Later, some suffered by the rust in some localities, but generally the crop is excellent. There was not as large a breadth laid down to wheat last fall as usual, and there will be still less this year. Two causes are operating: one, the price is too low; the other, many kinds of spring crops pay better, and that kind of tillage will not exhaust land so rapidly. Formerly it was the custom to sow wheat after wheat. It is now growing to be the custom to take a crop of wheat once in three or four years, stock down with clover, and alternate with pasture and spring grain. If followed for a few years, our wheat crop will excel anything that we have ever yet done in growing this grain. *Spring wheat* has suffered by reason of the drought, but will still yield a fair return." At a later date, August 11, we find similar statements: "The wheat crop, just harvested, as we have before had occasion to state, was one of unprecedented abundance."

The Danville Republican, speaking of the crop in the Genesee valley, says: "The crop is pronounced by all to be the best that ever grew in this valley."

The Plattsburgh Republican remarks, of the three northern counties, that the crop was very good. "Some of the finest fields of wheat" ever noticed in that part of the State, were observed in passing through Franklin and a part of Clinton county. In the interior of the State, and along the Mohawk in general, as well as south of these counties, the wheat crop was considered better than in the previous year. It is less necessary to pursue the detailed notices of the progress of the crop in this State, on account of being furnished with the statistics of the State census for 1844; and having thus a basis on which to learn, by comparison therewith, the probable increase or diminution. This has been done with considerable minuteness, and thus the conclusions drawn seem to deserve the character of more reliable estimates than for any previous year, except just after the census of 1840.

From information gathered since the harvest, it is believed that the gain on the crop of 1844, in the heavy wheat-growing counties of western New York, must have been from "20 to 25 per cent." In the southwestern section, bordering on Pennsylvania, the increase may not have been

quite so great; perhaps not more than 10 per cent. The season, however, was much more favorable—there was no rust. More towards the centre of the State, along Lake Ontario, and around the small interior lakes, as well still further south, and bordering on Pennsylvania, the report is not less favorable, and the gain is estimated at from 10 to 20 per cent.; and, in some cases, perhaps still higher. In the central eastern portion, along the Mohawk river, and extending south and north of this, the crop was much better than in the previous year, and the estimates, as variously given, are "15, 25, 33⅓, 50, and even 100 per cent." It may be recollected that great complaint has been made for several years past in some of the counties near the Mohawk river of the ravages of the weevil, which had nearly checked the cultivation of wheat there. The past year, however, this evil has been greatly lessened. Of Schoharie county, for example, it is said—"No injury from the weevil, which has heretofore destroyed the crop, and it is better in the ratio of a superior yield to an almost entire failure; the quantity of seed is larger than has been known in the best wheat-growing years." "The dry and warm season which brought the grain to maturity early, before the insect could prey upon it," is assigned as the probable cause. Of the crop in the adjoining county of Otsego, it is said that it was "nearly if not quite double the quantity of the crop of the year before. The weevil heretofore has prevented the sowing of wheat; but, as its ravages were less the previous summer, a greater quantity was sown and harvested last summer." There was likewise a "better preparation of the soil," and the quantity raised is "increased in proportion to the seed sown," and to the improved culture. In the northeastern section of the State, and bordering on Lake Champlain and the Hudson, the increase of the crop is estimated at "25 per cent." Lower down, however, in the vicinity of Rensselaer county, the drought operated unfavorably, and it is thought to have fallen off "10 per cent." The river counties have generally increased from 10 to 20 per cent., as they were not affected so much by the weevil and rust as in the previous year. In some cases there was less land tilled, but the quantity raised was greater, and the wheat was also of a better quality. Similar results are stated as to this crop on Long Island. Taking the whole State, therefore, we feel warranted in fixing the increase of the crop at a little above 20 per cent. more than that of the previous year. The census of 1844, which we have taken as the basis of our estimate, gave for that year 13,391,770 bushels, and the amount of acres thus cultivated 958,233 acres, which gives nearly an average of fourteen bushels per acre. We have compared the counties and notices respecting the growth of the crop and the harvest, as estimated by correspondents, with the census in detail, and thus feel more confidence in our estimate—meaning rather to fall short than to exceed the actual crop. There has been much more attention, on the whole, paid to the culture of this crop, and deep ploughing has in many cases been resorted to with the happiest effects.

Some interesting facts are mentioned in the Agricultural journals of large crops raised during the past year. Thus, to give a single specimen or two, the Genesee Farmer says: "The last harvest has turned out better than was expected at the time the grain was cut. We have seen a man who has spent most of his time for the last four weeks in threshing wheat with a machine, who says that nearly every farmer finds his yield

larger than he anticipated before it was measured. 'Mr. John Barber, of Farmington, took 1,500 bushels from 40 acres—an average of 37½ bushels. Thirty-three acres in Pittsford gave an average of 37 bushels. Sixteen acres in Brighton gave an average of 38 bushels per acre. Mr. Taft, of Greece, raised the past season thirty-six bushels of wheat on less than one-half acre of land. Seventy-two bushels per acre is a great crop.'"

This extraordinary growth is attributed to its having been manured with *horn shavings and scrapings*—Mr. Taft being a comb maker.

Some interesting remarks respecting the geological adaptation of the soil of portions of this State will be found in the appendix No. 2, among other papers relating to the culture of wheat hereafter mentioned. They are taken from an agricultural paper in this State.

Respecting the prospect for the coming year, we find the following observations in the correspondence of the Genesee Farmer:

"For one, I think the coming year will be a remarkable wheat season. My reasons are these: In the first place, the ground has been better prepared than I ever before knew it. Wherever I have been this fall, I have noticed a remarkable change in the preparing the ground for wheat, instead of the old method of getting it in, no matter in what condition. I have seen many who have adopted the proper mode of feeding the plant, with its natural ingredients, (such as lime, gypsum, ashes, charcoal, &c.,) and nearly all seem to think that wheat, in order to produce, should be so cultivated as to pay the cost of production, and that this cannot be done without preparing the ground in a proper manner. It has been one of the finest times for getting the seed into the ground, and having it germinate, that I ever knew; it seemed as if the rains came just often enough to start the seed, but not so much as to give it a sickly growth. I have noticed that, after a dry summer, we invariably have a good wheat season." The writer then recommends the employment of gypsum, as he supposes "the ammonia of the atmosphere, by collecting throughout the summer, and having but few chances to descend in showers, it comes at the proper time to benefit the young and growing crop;" and hence it is desirable to absorb it and hold it for the use of the crop. The editor of the Farmer, in some remarks, also approves the suggestions, and recommends, with such view, the use of plaster, ashes, and charcoal, as a top dressing in the fall or the winter, and says that "in travelling through many counties in the State, he never saw the wheat crop look better."

The wheat crop of Ohio, according to the notices we have gathered, was subjected to considerable vicissitudes in the early periods of the season. The following are some of the statements:

The Ohio Statesman of the 7th April, speaking of the cold weather, says: "The cold dry weather is favorable to the wheat crop, which looks very fine generally." The State Journal, published at Columbus, under date of 23d April, speaks of the "wheat fields as suffering severely from the protracted drought." "Several fields of wheat in the neighborhood of that city (it states) have been abandoned as worthless; and in most of the fields it has a sickly yellow appearance."

The Cleveland Plaindealer, of 1st May, remarks: "We have conversed with farmers from distant points along the lake shores, who tell us that the late rains have so improved the appearance of the crops, that they expect an average of wheat." In the Ohio Cultivator of the same date, after mentioning the severe drought, and a partial relief from a slight fall

of rain, it is stated: "The wheat crop, however, is not as generally injured as was at one time anticipated. We know of some fields that are quite destroyed by the conjoined effects of frost and drought; but such cases are not numerous. Most of the fields in this region are more or less thinned and killed in spots; though the plenteous rains of the past few days are giving them good color, and they look finely to the passers by. If the season proves favorable, the wheat crop of the State may yet be a good one."

The Ravenna Star also mentions the frosts and drought, and says: "Wheat and spring wheat seem likely to prove very light unless the continued unfavorable weather should render them a total failure."

A correspondent of a public journal from Newark, Licking county, writes, under date of 27th May: "Wheat, much of it, is suffering for rain, and in low places is injured by frosts." The Dayton Journal says, however, that "there is reason to hope the crop will be abundant in that section."

"It looks well about here," says the Toledo Blade. The Clinton Republican estimates, during the same month, that "there will not be more than half a crop of wheat." The Columbus State Journal, of the 29th and 31st of May, declares: "It is now almost certain that the wheat crop in that section of the State, and north to the lakes, is injured beyond recovery by the frost and drought. The crop, under any circumstances, will not be more than an average one." The wheat fields, with here and there an exception, look bad. With a majority of our farmers, the prospect of the wheat crop is hopeless. The frost of the 29th is mentioned as "one of the severest spring frosts ever known, cutting everything within its reach to the ground." The Findlay Farmer, of 27th May, says: "The severe drought is doing much injury to the wheat crop. Wheat is beginning to head, and some of it is not over a foot in height." Similar is the report given about that time by the Mansfield Shield and Banner, and by the Trumbull Democrat, in which apprehensions are expressed that there will not be more than half a crop. The Cincinnati Gazette, however, speaks more encouragingly about the same time: "We hear of some complaints in Ohio; but we think, from all we can gather, that we shall have an average wheat crop. Such is the promise now; and that promise is increased by the present weather. Rain is falling fast; and the dry earth is drinking it up as if athirst. Some sections have suffered severely from the drought; for instance, around Columbus and Mount Pleasant, in this county. In the latter they have had, until within the last two days, only three dashes of rain since February." With allowance, however, for diversity of opinion, there can be but little doubt that the wheat crop appeared most unpromising through the month of May. In the Ohio Statesman we find the following account respecting the wheat in their respective counties in this State, as furnished by the members of the grand jury during their attendance on the United States court, viz:

Lorain county—"about one-fourth of a crop."

Clermont—"the best for ten years."

Lake—"about the same as last year; not so much straw, but better filled, and the wheat much heavier."

Starke county—"will yield little more than half a crop; suffered greatly by the late frosts and dry weather. The grain, however, will be vastly better than last year, being full and plump."

Higland county—" a better crop than since 1839; not so much straw as usual, but well filled and heavy."

Tuscarawas county—" in the plains and river bottoms not half a crop of wheat; on the ridges more than half a crop; but not an average crop on the whole."

Richland county—" somewhat injured by frost and drought. Farmers think there will be as much wheat cut as last year, although more was sown."

Meigs county—" unusually good; this year better than I have known it for the last twenty years. Some fields in the northwestern part of the county, where the soil is of a cold clayey nature, were injured some by the late frosts."

Fairfield county—" crop about on an average; grain plump and full."

Guernsey county—" considerably injured by frost, although a full average crop, and the grain unusually full and plump."

Hamilton county—" crop in this county is larger than an average; the berry large and sound, and universally heavy, calculated to make flour of the best quality." Warren, Butler, and Preble, reported to be similar to Hamilton.

Greene county—" the greatest abundance of *wheat* ever known before, and of the best quality."

From the above it would appear that in the southwestern and southern central section the crop was very good, while in the northern central and northeast, towards the lake, it was not so good.

The month of June dispelled much of the apprehension which had existed respecting the wheat crop of Ohio; as the harvest came on, the accounts from all sections brightened. Thus we find such notices as the following:

" The crop is greatly injured, and field after field mostly ruined; yet there may be more wheat than the most sanguine have hoped for."—*Ohio Statesman, June* 2.

Again: " As for wheat, there is a much better prospect than a week or ten days ago. Though the crop will be short in Ohio, there is no danger of a famine. From many parts of the country the papers speak of fair wheat crops." " The wheat and grass crops were so far advanced that they must be quite light in most parts of the State, although the rains will greatly benefit them, and the yield will be better generally than was anticipated. Being light in straw, wheat will be less liable to suffer from rust than is usual; so that the yield may be as great, if not greater, than for several years past, especially in the central and southern parts of the State."

[From the Cincinnati Gazette.

Crops in the Scioto valley, Ohio.—A good judge, lately visiting this valley, writes us as follows:

" In going from Columbus to Portsmouth, I was much pleased to find that all portions of our fine valley have not suffered as much from the effects of cold and drought as the region about Columbus. From Circleville, south, the wheat along the valley promises fair; it is light in straw, but will be less likely to suffer from rust than if of strong growth, as last year."

"The wheat crop is much changed for the better; so that the panic created by the extreme drought is now at an end. The wheat, however, in this region, must be far below an average crop."—*Mount Vernon (Ohio) Times, 20th June.*

The Dayton Journal says: "Within the last two weeks, a most favorable change has taken place in the prospects of the farmer. The wheat has improved wonderfully, and there is no doubt but that the crop in this county will be greater than an average one. We have conversed with a number of farmers within a few days past, and all agree in the fact stated. The wheat has headed finely, and the berry is remarkably plump and heavy; so that the yield will not only be more abundant than usual, but the grain will be of a superior quality. If the farmer should have favorable weather for securing his crop, he will be amply repaid for his toil."

In relation to Allen county, the Lima Reporter says: "During the past ten days the weather has been as seasonable, and vegetation has grown as fine, as heart could wish. We have lately had copious and refreshing showers; and, instead of a famine, as some unnecessarily feared, we have now the fair prospect of a fine harvest. It is the general opinion of the people now, that there will be more wheat raised in the county this year than last." A correspondent from Champaign county, of June 28, thus writes to a friend in this city: "The wheat crop has come out beyond all our expectations; it is filled very plump."—*Cleveland Herald.*

Again: The Circleville (Ohio) Herald, of the 6th of June, gives a more favorable account of the crops in that section of Ohio. It says: "The injury is not so general as we had feared. We are informed that in some portions of the country the wheat crop will be an average one, and in others from one-half to two-thirds will be realized. The near approach of the harvest renders any attempt now to misrepresent the state of the crops useless." The Columbus Journal speaks of the wheat crop in that section as "heading well, and the grain better than it has been for many years. Occasionally a field may be seen in which the grain is worthless. In Muskingum and Licking, the wheat crop will be better than was expected. In Morgan better than it was last year." A gentleman from Washington county, Ohio, informs the Columbus Journal, that "the wheat crop in the Muskingum valley will double that of last year. In his own county, the farmers had nearly finished harvesting when he left, and they were able to speak with certainty as to the character of the crop."

"The wheat harvest has commenced earlier, we believe, than was ever before known in this country. We understand they were harvesting wheat in Groton a week ago. The crop is heavier than was expected a few weeks ago, and the grain is good. Late rains give us a prospect of other crops."—*Sandusky (O.) Clarion, June.*

"We have had a favorable change in the weather within the last two weeks past, which has wonderfully improved the appearance of the wheat crop. In some of the townships we heard it stated that the crop will be an average with the last two years as to quantity, while the quality will be quite superior. If the farmer shall have favorable weather for securing his crops, the yield will be abundant."—*Painesville Telegraph, June 25.*

"The abundant rains with which the country has been blessed during the last ten or twelve days have very much improved the crops in this section, and indeed throughout the State. From what we are able to gather from our exchanges, we think there will be full two-thirds of an average yield of wheat in the State. In Erie county we have heard that

the wheat crop will be nearly if not quite as large as last year. The quantity in this county will be much larger than any one anticipated two weeks ago—more, probably, than will be needed for home consumption."—*Huron Reflector*, *June* 25.

The accounts in July are generally more flattering, as the weather was more favorable for the harvest. Still some of the sections suffered from the previous drought and cold. We throw together a number of notices with reference to various parts of the State, as given in some of the public journals during the month of July:

"Within the last two weeks a most favorable change has taken place in the prospects of the farmer. The wheat has improved wonderfully, and there is no doubt but that the crop in this (Montgomery) county will be greater than an average one."—*Dayton Journal.*

"We are told by many of the farmers that the yield of wheat will be twice as great this year as last."—*Xenia Torchlight.*

"The farmers are now very busy with their wheat. The crop to be secured is better than any which has been raised for the last ten years."—*Dayton Journal.*

"The wheat, we are told, is generally very well filled; but that cut before the rain has in many instances grown."—*Butler County Journal.*

"From what we can learn, the crop in old Muskingum county, this season, will no doubt exceed that of the last, which was little over half a crop, and the quality is far superior. Indeed, it is said that the grain cannot be surpassed for size and plumpness."—*Zanesville Republican.*

"Our wheat crop will be probably better than it has been for the last four years."—*Highland Co. Gazette.*

"A person from Williams county, Ohio, informs us that the crops there look fine. Wheat is better than it has been for many years.

"With occasional fine showers, we have had sufficient dry weather to enable farmers to harvest their wheat in good order. South of this it is nearly all secured. In this region it is nearly all cut, excepting where fields were injured by frost, and a second growth of heads put forth; patches of this kind are in some cases struck with rust, but as a whole the quality of the crop is remarkably fine. The quantity is not large, though as great, we believe, as the average for several years past. The same, we learn, is the case in most of the eastern counties along the Ohio river; also in the western portion of the State; but in the central northern counties, including most of the best wheat region, the crop is said to be very deficient. The Cleveland papers complain of severe drought in that region at the present time."—*Ohio Cultivator*, *July* 15.

Again, in the same paper of another date: "The wheat, too, that was not killed by frost, has filled out more plump and heavy than has been known for many years in these parts, and the yield, though very light in straw, will, it is judged, be greater than for two or three years past; though this is not the case in many of the more northern counties, where the most wheat is commonly produced."

"The panic created among the farmers of this vicinity, and among others, has to a great extent ceased; at least so far as Pickaway county is concerned. From present appearances, we assert that the yield of wheat in this county will be larger, and the grain better than the crop has been for the last four years."—*Guard and Pilot.*

"The journals of last week, in Jefferson, Ross, Muskingum, Licking,

Fairfield, Franklin, Clark, Greene, Montgomery, Warren, and Hamilton counties, all speak of the harvest having been partly secured, and pronounce the wheat crop as good or better than for some years past. The quality of the grain very superior.

"We are glad to hear, by our country exchanges, that the wheat crop has most agreeably disappointed the farmers. The smallness of the stock has been made up by the plumpness and fullness of the grain. Even in Starke county, and others in the neighborhood, where the crop was supposed to be badly destroyed, it turned out to be very good. In the Miami country it never was better."—*Cincinnati Chronicle*, 11*th inst.*

The St. Clairsville Gazette (Belmont county) says: "The yield is not large in this county, but what we have is excellent; we have seen samples that weighed 68 and 70 pounds to the bushel."

The Milan Tribune says: "The wheat harvest is about over, and a fine time the farmers have had."

The accounts received at a still later date, and since the harvest has been fully gathered, exhibit much diversity, and in some instances appear to be at variance with the foregoing.

From the counties lying north of the centre and along Lake Erie, we learn that the drought so much affected the crop as to lessen it at least "33 per cent." The crop also in the counties northeast of the central, comprising Wayne, Starke, &c., are said likewise to have suffered severely, and the crop is considered to have been "30 per cent. less." The counties adjoining these, bordering on Pennsylvania and the Ohio river, are likewise estimated to have suffered at least "30 per cent." Of the north central counties, comprising Delaware, Marion, and Richland, it is said that "wheat was a poor crop in 1844, and much worse in 1845. In many townships the yield did not return the seed. The Hessian fly did not much injure the crop of 1845, but the warm and pleasant fall which we have just passed has favored and extended the ravages of this insect upon the growing crop." The loss is estimated at "50 per cent.," and by one correspondent the damage has been put as high as "70 per cent." In the southeastern section, from the centre of the State, the crop is thought to have been "better by ten per cent." Further to the north it is said to be one-third less. In the upper part of the Scioto valley, just south of the central counties, the crop is considered as fully equal to that of the previous year. In the Miami valley and the southwestern counties of the State, bordering on Indiana, it is estimated to have been from 25 to 30 per cent. better than in 1844. A good judge, speaking of the centre of the Miami valley, says: "Much apprehension was felt during the early part of the season, on account of late frosts and protracted drought, that the crop would prove a failure, but the grain filled out well, and was almost entirely free from smut and rust." He thinks it to have been "30 per cent. better" than in the previous year. In the northwestern counties bordering on Indiana, Michigan, and along the Miami river, the crop was much better; and it is estimated even as high as "50 per cent. more." In the section along Lake Erie, east of these last counties, also, the decrease is thought to have been "25 per cent."

In the Albany Cultivator of January, 1846, a correspondent from Zanesville writes thus, respecting the crop in some of the counties heretofore named, which gives a somewhat different view from that which is mentioned above. He says:

8

"On all flat lands in the northern part of Licking, parts of Delaware and Franklin, and considerable portions of the adjoining counties north, the wheat crop of last season was almost a total failure, in consequence of a frost the 29th of May. I am told that the farmers now have to buy their wheat for family use; and many, who early in the spring thought their prospects good for a crop of 400 to 600 bushels, did not get even so much as their seed."

In Muskingum county they think they have little more than half of an average crop of wheat; but what there is, is of a superior quality."

A good judge writes respecting Muskingum county and its vicinity:

"At your request, I give you my views of the general character of the wheat crops of 1844 and 1845 in this vicinity; and by 'this vicinity,' I mean the region of country supplying the mills here with wheat.

"The breadth of wheat sown in the fall of 1843 was very large, and the prospect for a good crop unusually propitious until the time of the wheat blooming.

"Just at this most critical juncture, we had a succession of wet, stormy weather, for two or three weeks; so much so as to damage the crop in quantity to the extent of *one-half;* and the quality, also, was *very much* deteriorated, the average weight not exceeding 53 lbs. per bushel. On the whole, I consider the wheat crop of 1844 in this vicinity less than *one-half* of an average.

"In the fall of 1844 the breadth of wheat sown was somewhat less than in the previous year. The appearance of the wheat on the ground in the early spring was also less propitious; still the prospect was tolerably good, and the crop would probably have been an average one, but for two or three very severe frosts which occurred in the month of May—the first about the middle of the month, and the last towards the close.

"The effects of these frosts were immediately visible, and great fear was entertained that this vicinity (and, indeed, the whole of Ohio) would not yield sufficient for consumption and seed. Thousands of acres were not worth cutting at the time of harvest, and thousands more hardly repaid the labor of saving and threshing.

"So far as I can at present judge, the crop in this vicinity will not be over *one-third* of an average, and certainly not one-half. The quality is fair, weighing generally from 58 to 60 lbs. per bushel; some of the wheat partially injured by the frosts weighs very light—say 52 to 54 lbs. per bushel.

"The prospect for the coming harvest (1846) is at present very encouraging; the quantity sown last fall was unusually large; and farmers, having been disappointed in their hopes for three successive years, took more pains in seeding than perhaps ever before in this vicinity. The season, also, was unusually propitious during the time of seeding, and has continued so up to the present moment.

"The foregoing are my views in regard to the two wheat crops of 1844 and 1845; and, during the whole of my experience, I never witnessed any thing to be compared with them. In 1844 the quality (in addition to a deficiency of nearly one-half) was such as to render it impossible to make a good quality of flour; and in 1845, although the quality is fair, the quantity is probably not more than *one-third* of an average."

It will be seen, therefore, that the drought affected some sections of the State far more than others. A comparison has been made anew with the

census of 1840, to ascertain as carefully as possible what sections have yielded the greatest amount of wheat, as also the population; and, after the best investigation of the causes operating on the crop of 1845, it is believed that it must be fixed at about 15 per cent. decrease from the previous year. This conclusion may not correspond with that of some; but it is hoped that those who are disposed to decry it will at least do us the justice to go through, in detail, as full a collection of notes and as extended a comparison as we have done. It will be seen, by a reference to the report for that year, that the crop of 1842 was a very large one, and that there has been a falling off from that year on account of the rust, &c.; yet it is believed there has likewise been a gradual increase of the quantity of land sown with wheat, and the modifying influence of this element must be allowed to balance, so far as proper, the decrease. It is not improbable that the deficiency of last year, (1844,) compared with the crop of 1842, may have been somewhat too large, and regard has been had to this consideration in fixing upon the estimate in the table; and thus the proportion which the present one bears to that of 1844 is different from what it might otherwise have been.

The early notices respecting the wheat crop in the great State of Pennsylvania, which stands among the first in the culture of this grain, were, on the whole, favorable. In April, the Germantown Telegraph says:

"The grain looks well in all directions; and, should ordinary favorable weather continue for the ensuing month or six weeks, a heavy crop of wheat may be anticipated."

Early in May, also, we observe the following notices:

"The appearance of the *grain* now indicates an abundant and plentiful reward for the husbandman's toil."—*Lewistown (Pa.) Democrat.*

The editor of the Newtown Journal, who has been taking a tour through part of Bucks, Montgomery, Philadelphia, and Delaware counties, Pennsylvania, notices the fine appearance of all kinds of vegetation: "The *wheat* crop, especially, looks unusually fine. Several old farmers in the vicinity of the Brandywine say they never saw a finer prospect of winter grain."

"*Lock Haven, (Pa.,) May* 10.—In our own immediate vicinity the *grain* fields look exceedingly promising."

Lancaster, Pa.—The Intelligencer says: "Never within recollection has this great agricultural county given promise of more abundant crops than in the present season. The late rains came most opportunely, and there is little doubt now of the utmost abundance in all the products of the soil."

Somewhat later, there is complaint made, in some sections, of drought, and a frost in the last week of May, by which the wheat crop was considerably injured. Thus the Western Star, of Beaver county, (Pa.,) of June 6th, says: "We are sorry to say that the reports of our farmers now in attendance on court from different parts of the county, respecting the damage done to the wheat and rye crops by the late frosts, are of the most discouraging nature. A few days more will disclose the extent of the mischief. Owing to the long-continued drought, the crops would have been light without frosts; but if the grain be killed, as is stated, it will prove a serious calamity. The farmers must endeavor to provide for the deficiency by sowing and planting buckwheat and potatoes."

"*The damage from frost.*—We have before us a letter from a corres-

pondent at Lancaster, in this State, by which we learn that the frost of Thursday and Friday nights of last week was even more disastrous to the *wheat* crop of that county and of Chester county than it was in the immediate vicinity of this city. Many fields have been damaged, and some entirely destroyed. The effects of the frost were more fatal in consequence of the enfeebled state of vegetation from long drought."—*Philadelphia Ledger.*

In a communication to the Farmers' Cabinet, from Chester county, it is stated that the damage was mostly to the Mediterranean variety, that being earlier than some others. A portion of this statement is subjoined, as it contains some interesting facts. The thermometer is thought to have been as low as 30°.

"The most severe loss falls on our wheat fields. The wheat mostly grown about here is the Mediterranean, which is a very early variety. The crops were quite promising, and our farmers calculated confidently on more than an average yield; but those hopes were unexpectedly cut off. Most of our wheat was in blossom. I had walked through a fine field within a day or two of the frost, in company with one of our farmers, and we were admiring the regularity of the blossoms on the plants. The morning after the frost, he observed to me that it was his opinion such a night would kill the wheat. Within forty-eight hours the evident tinge of brown, which showed deeply in the hollows and faded away up the hill sides, proved that his fears were well founded. The idea of a frost, so late in the season, injuring so hardy a plant as wheat, was new to most of us, but we had to admit the fact since it was so plainly before us. It is evident that the action of the frost was entirely on the *blossom;* the plant itself is yet as healthy looking as ever, but no grain has formed. Such an occurrence is so unusual as to be almost unknown to farmers; and, indeed, most with whom I have conversed on the subject were inclined to doubt its having ever occurred, though a few think it did happen slightly two years ago, in their neighborhood. The effect of trees in protecting grain is not a little remarkable. Woodland, on the north, served to keep off the frost some distance beyond where the shade of the trees would be cast in the day; and, in one instance, a small grove of chestnuts in the bottom of a hollow, where the frost was the heaviest, completely protected the wheat for many yards beyond the shadow of the trees. A small patch of potatoes, which ran up into some woodland, forcibly illustrated this, also; under the trees the tops of the plants were untouched—further from them they were just tipped; while, further, portions of them were cut to the ground.

"On the higher hills many escaped untouched, and those which were injured suffered but slightly. The Mediterranean wheat was almost the only kind injured, though in some places some other varieties did not escape; the later kinds around us promise a very fine yield, having escaped by not being in blossom at the time. Some of our farmers cut down their wheat, so fully were they convinced of the destruction of their crops. This was the case in Doe Run and East Marlborough townships, and probably in other places."

The editor of the Cabinet adds in a note—"We have understood from different neighborhoods that the wheat affected by this frost was generally, though perhaps not quite exclusively, the Mediterranean. This is an early ripener; and it is possible that this circumstance, subject as we are

occasionally to pretty hard frosts late in the season, may prove a serious objection to it."

As the harvest came, the accounts continued more favorable. The Adams Sentinel, published at Gettysburg, says: "Our farmers are in the midst of a plentiful harvest. We learn that the crop of wheat in this county is much better than it has been for many years."

The Germantown Telegraph of July 2 has the following statement: "The Westchester Register of July 1 states, 'that many of the fields of wheat in the vicinity appear ready for the sickle. If the weather is fair there will be much grain cut and housed the present week. The grain harvesting has commenced in earnest, and about a week in advance of the usual period. The crop of wheat is estimated to be a full average yield.'"

Again: "A gentleman from Washington county informs the Pittsburg Gazette that a good deal of the wheat, particularly the Mediterranean, has been cut in that county. This species of wheat has turned out exceedingly well—given large and fine crops. Its appearance is somewhat remarkable beside our common wheat, and the heads are very well filled." —*July*.

Similar to the above are the notices found in the papers respecting the crop in general of this State. "The wheat harvest in Pennsylvania is the best we have had in many years. The crops are heavier, cleaner, and freer from rust than they usually are. The crops in Pennsylvania are, it seems, above the average." The Harrisburgh Union says: "Almost every paper we open from the interior of the State speaks favorably of the late crops. We learn that the harvest is now over, and the *wheat* crop is said to be one of the heaviest and most abundant that has been gathered for many years. The quality of the grain is decidedly superior."

The information derived from others also corresponds with the foregoing. Of the crop in the well known agricultural county of Lancaster, it is said: "The mild weather in the month of March and the beginning of April was so favorable to vegetation, that it was apprehended the growth of wheat in our productive and highly cultivated lands would be so luxuriant as to cause it to fall before the grain was matured, and thus occasion a deficiency in quality and quantity; but a continued spell of dry weather during the months of April and May retarded the growth of the plants, and prevented the exuberance that had been anticipated. On the 29th of May the prospect of an abundant crop was as flattering as the heart of man could desire, but on that night a severe frost occurred which blighted the prospects of many of our industrious and thrifty farmers. Hundreds of acres were so completely destroyed that they would not compensate the laborer for cutting it. That which grew on low level lands sustained the greatest injury, particularly where situated contiguous to streams of water. That species or variety of wheat called the 'Mediterranean,' which was introduced into our country a few years ago, being an early wheat, capable of withstanding the attacks of the Hessian fly, and less subject to injury from mildew and rust than others, suffered most from the effects of the frost, from the circumstance of its being further advanced, and in the condition where the tender blossom of the berry was exposed, or in consequence of its being more tender and less able to endure the intensity of the cold. I am inclined to attribute it to the former cause, as that wheat principally was all out in heads, and fairly

exposed, whilst a large part of the other was still enclosed in the folds of the blade leaf of the stalk, and in some degree protected from the violence of the weather. From that time until harvest, the weather proved favorable to the maturing of the crop; the heads were well filled, and the berries plump and fair, so that it remained uninjured by the frost; the yield was abundant, and the quality superior. And it is believed that the aggregate of the wheat crop throughout the county will fully equal that of 1844."

The account communicated to us from Chester county fixes the increase of the crop over that of 1844 at "25 per cent." The following are some of the remarks made in the letter: "The wheat crop of the present year is a good average. Some fields in low situations were injured by frost about the first of June, when in blossom, but the large amount sown, and the good yield, fully supplied the loss. Much of the wheat yields a bushel to a dozen sheaves of ordinary size, and weighs sixty-five pounds to the bushel. The Mediterranean is more extensively cultivated than any other, chiefly because of its exemption from the depredations of the Hessian fly. It is very much improved in quality since its introduction here, and is now esteemed as highly as any other red wheat. It has in some instances been injured by the fly, and it is not probable that it will much longer resist their attacks, unless fresh seed be brought from abroad. The Hershe, and some other varieties of white and red wheat, are also cultivated to some extent." In other parts of the southeastern section of the State it is said: "The quantity is about the same, but the quality is equivalent to an increase of 10 per cent." In the eastern counties bordering on the Delaware river, and towards the centre of the State, including Bucks and Lehigh, the increase is estimated at about "10 per cent." The injury by the frost is complained of, especially in Lehigh county; but it is added, that "there was no blight, and what escaped the frost yielded well." In the south central section, bordering on the Susquehannah river and the Maryland line, the crop is considered to have been "50 per cent. better." There was "a favorable winter, and a dry March and April, with a favorable time for the filling season. No mildew or rust, and great freedom from the fly." In the central counties, lying on the Susquehannah and its branches, the crop is stated to have probably exceeded that of 1844 by "one-third." Northeast of these the gain does not seem to have been so great, and it is estimated at from 5 to 10 per cent., and the grain is described as being "very good, plump, and heavy." In the northwestern part of the State there was an advance of "about 10 per cent., but the crop of neither year could be considered a full crop." Our information respecting the crop in the southwestern, the northern and southern central sections, is not as good; but so far as we have been able to ascertain, there has been an increase in almost all parts of the State. It is believed that the advance of 20 per cent. on the crop of the preceding year, which was one attended with considerable blight and rust, will not be too great, if it is indeed large enough.

Virginia is also among the largest wheat-growing States. The early appearance of the crop in this State did not promise much, but the fears of the agriculturist were happily not realized.

In the months of March and April, mention is made of the drought and frost in many parts of the State. In Rockingham, however, the public journals speak of refreshing rain, the influence of which was felt on the vege-

tation generally, and "the crops of small grain, especially," were "greatly benefited." So that there seemed to be "the most promising assurance of a bountiful harvest."

The Richmond Whig, under date of April 20, says: "We regret to learn that the destruction of wheat by the late frosts was much greater than we supposed." And, in May, again: "Much of the May wheat was irreparably injured, but the late wheat bids fair to give an average yield."

The Petersburg Intelligencer, likewise, during the same month, states: "The wheat crops in the James river country, above tide water, have been damaged seriously by the frost and dry weather."

Again: The last Rockingham Register, speaking of the late severe frost, says: "We learn that in some parts of this county, the wheat crop, which a few weeks ago presented such a cheering prospect of harvest, has been almost totally destroyed. The damage done to the wheat by the frost in Augusta, we understand, is much more extensive than was at first supposed, particularly along the water-courses."

The Richmond (Va.) Times says: "We are glad to learn from the wheat-growing sections of the State that the wheat crop is far better than, a few weeks since, it was supposed it could possibly be. Even the early May wheat, which was thought to have been ruined by the frosts of the 9th April, and the cold dry weather thereabouts, has started forth under the invigorating influence of the genial weather for some time past, and now promises a yield fully equal to half a crop.

"The *wheat* crop of the lower James river region suffers more than in other parts of the State. There, a large proportion of the early wheat is cultivated, and there the crop of all kinds of wheat is earlier than in the middle and valley districts; therefore it was most injured by the frosts of April.

"Our accounts from the valley represent the *wheat* crop to be unusually fine and promising."

"All the May wheat—and the culture of that species has become quite general—has been frosted so as to destroy full half of that portion of the crop. Some fields I have seen look yellow, as though harvest was as hand."—*Richmond Whig.*

"The weather continues dry, with no appearance of rain. It also continues cold, especially at night. We learn that there is danger of the *wheat* crop, especially on the hills. The Richmond Enquirer says, that all the fruits of that region have been touched by the late frost, and that the wheat has not escaped."

Toward the close of May, and in the season of harvest in June, however, as well as subsequent, the accounts are more favorable.

"The prospect for a fine crop of wheat in this vicinity, at present, is excellent. The grain looks well, and the opinion is generally entertained that if no untoward circumstances occur, the yield will be unusually heavy."—*Harrisonburg (Va.) Republican, May* 17.

The Richmond Compiler says: "Some few farmers in this neighborhood have cut their May wheat, and represent the quality as very superior, and the yield about an average one—greatly better than was expected. The late wheat promises even better, and, should it receive no injury in the brief space before harvest, will be a very fine crop. The harvest for the late wheat will begin about the 10th or 12th instant. No contracts

for wheat have been made, and we believe this year none will be entered into. We have not had rain for some time, and vegetation begins to suffer in this vicinity."

Again: "We have had several very refreshing rains in the last week or two—enough, as we have been informed by several of our farmers, to make the wheat."—*Martinsburgh Gazette.*

"Harvesting has commenced in this section, and generally we believe the wheat crop will turn out well, notwithstanding the inauspicious promise of the early spring."—*Lynchburg Virginian.*

"Our farmers have commenced securing the early wheat, the quality of which is generally very good—indeed, from present appearances, the crop will generally be of good quality. At this season of the year there is a good deal said about the quantity. We think from what we can learn, and our information can be relied upon, that there will be an average crop, and perhaps more than for several years past."—*Virginia paper.*

"Several of our farmers are already cutting their Mediterranean wheat; and, from present appearances, we are inclined to think the general harvest will be earlier than usual. The prospect is tolerably fair."—*Ib.*

"The Richmond Compiler says that the growing grain in the southern section of Virginia has nearly recovered from the effects of the drought; and that the May *wheat*, though much injured by the frosts, will yield very well."—*Winchester Republican.*

The Southern Planter says: "As far as our observation has extended, the cold and unfavorable season has affected the growing crops most seriously. The wheat, which was cut down by the frost, has measurably recovered; and, as it was a novel case, it would, perhaps, be as well for our correspondents to record their experience upon the subject. For ourselves, we believe, if it had not been for the drought which followed the frost, the young shoots would have put forth with sufficient vigor to have fully supplied the place of those that were killed. As it was, the crop of early wheat will be more than half a one, and the late crop is very promising."

In other public journals we find similar notices, sometimes without reference to the particular sections.

"The wheat crop this season, in Frederick county, Virginia, is said to be the heaviest that has been harvested for many seasons."

"*Wheat* harvesting has commenced in this State, and the crops, with the exception of the May wheat, are said to be very good." The Richmond (Virginia) Times says: "The wheat crop will be fully an average one; the frost has not injured the wheat." "The *wheat* crop has been all gathered in excellent condition, and is more than the usual average." So far as we have been able to ascertain from other sources, the result of the harvest corresponded with the foregoing statements. We have not as full information as could be desired, owing to the failure of answers to our circular, in season for the present estimate. In the section east of the Blue Ridge, lying in the central part of the State, from Bedford through to Orange counties, and which appears, from the census of 1840, to comprise some counties where large quantities of wheat are grown, it is said: "The crop is exceedingly fine in quality, and fully an average in quantity. It was somewhat injured by the late frost last spring; but except as to the very early May wheat, the damage was slight." As the crop in

this section fell off so largely in 1842, and but just recovered its amount, as exhibited by the estimate of 1844, we believe that an average crop will exhibit some advance for the past year. In the counties east of the last mentioned section, it is said: "Wheat in quantity was about the same as in 1844, but in quality it was 10 per cent. superior." The southern central counties, from Halifax and Franklin, along the line of North Carolina, are thought to have exhibited an increase of "25 per cent." The northwestern section of the State also appears to have harvested a good crop, as it is thought there to have been "25 per cent. better." In the western section, lying on the Kanawha river and its branches, and south of the last mentioned, the increase is likewise estimated at "25 per cent." above that of 1844. Taking into view the early condition of this crop, it is believed that we are justified in fixing the increase of the crop at 10 per cent. above that of the previous year. The editor of the American Farmer, speaking of the Virginia wheat crop, says: "Though disasters have occurred to blight the prospects of particular regions, we entertain the belief that the wheat crop, on the whole, will prove more than a fair average one." A correspondent of the large wheat-growing region in the valley country says, likewise: "The wheat crop is a good one—the first good one we have had since 1839." Another public journal, alluding to the general crop in Virginia, says: "The crop is decidedly above an average one."

Respecting the Maryland wheat crop, we have gathered the following information. The appearance during the month of March was considered most flattering. As a specimen of the statements contained in the public journals, we give the subjoined:

"The accounts from all round the country represent the wheat crops to be in a most thriving condition. The fields are as green as is usual on the first of May. It is too early to make any certain calculation of the next harvest; but the indications have never been more favorable at any season than they are now."—*Baltimore Patriot.*

"The appearance at present presented by the growing crops of wheat could not possibly be more promising. They possess all the cheerful verdure and vigor which is usually distinguished at the close of the present month, and, unless retarded in growth, we may calculate upon one of the finest crops we have ever had."—*Hagerstown (Md.) Torchlight.*

Again: In April, the Easton (Talbot county) Gazette says, that the *wheat* crop presents a very promising appearance. The Williamsport Banner says: "The *grain* crops of Washington county have never, within our recollection, presented as beautiful and flourishing an appearance as at this time. They bid fair to yield the farmer a plentiful harvest." Somewhat later, however, the Williamsport Banner says: "In consequence of the continued drought the wheat crop does not present as flourishing an appearance as it did last week." The view of the wheat crop in May is, on the whole, most favorable, though some diversity exists in particular sections.

"We learn that the *wheat* looks well in Talbot county, being from fifteen to twenty inches high on a level, a few days since. Some wheat there is stated to have reached the height of four feet, and all headed out. The Weekly Sentinel, published at Centreville, Queen Anne county, says: 'For several days past we have had most delightful weather for the growing *wheat*. The prospect for a good crop could not be more favorable.'"—*Baltimore Sun.*

A letter from Talbot county (Md.) says: " *Wheat* looks well here, and there is a prospect of fine crops, it being from fifteen to twenty inches high on a level. I have heard of some wheat in this neighborhood four feet high, all headed out."

The Port Tobacco (Charles county, Md.) Times says: "The *wheat* crop looks well; and, unless attacked by rust, fly, or some of the many ills that sometimes carry it off, bids fair to produce a good yield."

Again: "We learn from friend John Poland, of the Westernport district, that the crops, and vegetation generally, present quite a different aspect in that region since the refreshing rains some days since. The prospect of a good crop is very flattering. Indications from other parts of the country are equally so.

"Accounts from various sections of the country indicate a like glowing prospect. The editor of the 'Catoctin Whig,' of Middletown, in this State, says he has conversed with many of the farmers of old Middletown valley, one of the best grain-growing regions in the country, who entertain the highest hopes of an abundant yield of every kind of grain."—*Cumberland (Md.) Civilian, May* 1.

The Westminster (Md.) Carrolltonian says: "The whole crop in this county generally presents a remarkably fine appearance; and, if there is no unfavorable weather, the crop will be very heavy."

The Frederick Examiner says: "We have never seen the crops so forward at this season of the year as they are at present. The wheat is fine and heavy. The prospect could not be more favorable."

The Frederick (Md.) Herald says: "The rain of last week has given an additional tinge to the deep verdure of our fertile farms. The prospect of a *wheat* crop has never been more flattering.

"We learn from a gentleman who has just returned from the western portion of the State, having passed through the greatest portions of Washington, Frederick, and Carroll counties, that the crops never looked finer, or promised a more abundant harvest. The rain of Wednesday was very general in those parts."

"A letter from Harford county, to a gentleman in this city, gives a good account of the crops in that vicinity. We learn also, from gentlemen who have recently visited the Eastern shore of Maryland, that the crops there are very promising."—*Baltimore Patriot.*

"If the weather continues as favorable as present appearances indicate, our farmers will be enabled to cut their crops about the middle of June."—*Catoctin (Frederick Co., Md.) Whig.*

"The Williamsport (Md.) Banner brings us the first complaint of the *wheat* crop we have yet had from any quarter. It says: 'We regret to state that in consequence of the continued drought the various species of grain in this county present a sickly and unpromising appearance. The smut, it is said, has made its appearance in the *wheat*, and the crop will be nothing like as abundant as formerly supposed.'"—*Baltimore Patriot.*

At a subsequent date, the Williamsport (Md.) Banner says: "The rains with which we have been visited during the past week have not been without their beneficial results. The *wheat* looks beautiful, giving promise of a copious harvest. The *wheat* in our county, (Talbot) since the passing of the drought, begins to look very promising and healthy. We have heard from a few farmers that the fly has commenced its destruction upon it; but as we have not heard it much spoken of, we are inclined to believe it is not

general. Should no disaster happen to it, we believe, notwithstanding the lengthy drought it has passed through, the harvest will be abundant."—*Easton (Md.) Gazette.*

"*Coldspring, Washington Co., Md., June* 2.—We have just had three severe frosts. The wheat appears to be in full bloom. No doubt the bloom is killed by the frost, and that the heads will be deprived of germination. Therefore, what we call in this country the *wheat* heads will be dropped. More than half will be destroyed should the germination be stopped on what is now in bloom."—*Baltimore Patriot.*

"Accounts from almost every section of the State concur in representing the wheat crops to be in excellent condition, and offering the promise of a full yield."—*Baltimore American.*

"A letter to the editor from Pipe creek, Carroll county, dated May 24th, says: 'I never saw the crops of *wheat* and rye appear finer than they do now in this whole section of country.' * * * *

"The Howard District Press says: Intelligence from all parts of the District represents the crops as in a flourishing condition."—*Baltimore Sun.*

In the months of June and July, during the harvest, the accounts continue to represent the crop to be a good one. Thus:

"In this State, also, the expectation of a good crop seems to be realized. The *wheat* harvest is already in progress. The Hagerstown Torchlight states that 'the wheat crops are uniformly good; and if they escape future damage, there cannot be a doubt but the yield will be greatly more abundant than any within the last eight or nine years.'"

The Kent News says: "The farmers have been generally engaged the present week in their wheat harvest. Our town has been dull, but we hope that good crops and 'good prices' may be realized by every one."

The Frederick (Md.) Herald of June 9, says: "Our crops of wheat and rye are all off, and a great portion of them already in the stack-yard and mow. The harvest is a heavy one, and its benefits will be felt by every class of our community."

"We see it stated in the Hagerstown Herald of Freedom, that the yield of wheat in Washington county will be a most bountiful one. Grain was cut in some parts of this county on the 11th instant, several days earlier than in any previous year.'

"The farmers of Carroll county, Maryland, have nearly finished cutting off their wheat crop. Indeed, many of them have finished housing it. Beyond doubt it is the largest crop ever before raised in the county, and the product will be double as much as it was last year."—*Carrolltonian.*

"Our farmers," says the Centreville Gazette, "have completed their wheat harvest, and, from all accounts, so fair a crop has not been cut for many years."

The following notice, however, somewhat conflicts with the last statement, though it refers to a different part of the Eastern shore:

"We see it stated in the Cambridge (Dorchester county) Chronicle, that in some fields the wheat is good, but on nearly all the light lands the Hessian fly has made some serious ravages, and in many instances rendered the crops totally worthless."

In Lyford's Price Current, under date of June 14, we find the opinion expressed that the wheat crop will be an average one. We give it, and the opinions of some other public journals, as we find them:

"The statements are very conflicting in regard to the forthcoming wheat crop. In some sections of the same State there are indications of a small crop, while others promise an abundant yield. We incline to the opinion, from what has been presented to us through the papers, that in the general there will be fully an average crop, if no injury is imparted to it before harvesting, as just previous to that operation lies the great danger of rust, arising from rains, immediately followed by a hot sun, which usually generates a humid atmosphere, while the heads of the grain are filling."—*Lyford's*, *Balt.*, *June* 14.

"The Baltimore American describes the weather to have been most delightful for harvesting, and the crop, it is believed on all hands, will be full as to quantity, and excellent in quality."

The Williamsport Banner says: "The harvest is now entirely gatherd in, and is one of the heaviest that has been cut for many years. The farmers state that, as to quantity and quality, it has rarely if ever been surpassed."

"Our Maryland exchanges bring us glowing accounts of the abundance of the crops, especially in wheat. In Queen Anne county the quantity and quality have rarely if ever been surpassed, while in Kent county a larger crop has been gathered than for many years."—*Baltimore Clipper*, *July* 15.

"The wheat crop of Maryland of the present year has not only been an abundant one as to quantity, but is likewise remarkable for the excellence of its quality. In the valley of the Susquehannah the products of numerous farms have been found to weigh sixty-eight pounds per bushel. In Frederick county, Maryland, the crop of one farm, recently sold to a miller, weighed sixty-eight to sixty-nine pounds per bushel."

On the whole, we believe that the crop was above an average one; therefore place it at an increase of 20 per cent. over that of 1844, which, it will be recollected, was a tolerable crop. Indeed, in the northeastern section of the State, some have placed the advance as high as one-third more.

The following notices of large yields have met our eye in connexion with the statements respecting the crop of wheat in Maryland:

"Mr. Joseph L. Huffer, near Catoctin, Maryland, for the purpose of testing his probable yield of wheat, threshed out fifty shocks, having 12 ordinary sheaves to the shock; and having measured it with his own hands, found it to produce the extraordinary amount of 41 bushels. Mr. Huffer's entire crop will turn out equally as well as the above parcel."

"Mr. Delashmutt, of Buckeystown, Frederick county, Maryland, delivered a load of wheat at the Monocacy mills, a few days ago, weighing sixty-nine pounds per bushel. It is believed that his whole crop will average sixty-eight and a half pounds per bushel!"

"In all contests for superiority in raising agricultural products, Carroll county is always a prominent, and most generally, a successful competitor. We lately published accounts of certain lots of wheat raised in Frederick county, that weighed sixty-eight and sixty-nine pounds to the bushel. The Carrolltonian states that some white wheat, the product of the farm of Mr. John Orndosl, of that county, was measured, and weighed seventy-nine pounds to the bushel."—*Baltimore Patriot.*

The wheat crop of North Carolina was more seriously injured. As early as in April, the Raleigh Register states: "The late drought has destroyed the *early wheat* in many sections of North Carolina, and much of it has

been either ploughed up or the cattle turned into it." The Norfolk Herald, Virginia, makes similar remarks respecting the crop in the neighboring counties of North Carolina, and says: "The crop is expected to be short." And in May, a letter from Chatham county, in the Raleigh Register, states: "We shall not have half a crop of wheat this year in this part of the country, caused by the cold and drought." Again: "A gentleman who is an extensive planter, residing a few miles from Edenton, North Carolina, commenced cutting his *wheat* on Thursday, the 22d May, being some weeks earlier than the usual time of harvesting. We are not informed, says the Edenton Journal, whether this gentleman's crop is a fair one or not, but we do know that the wheat crop generally, in this county at least, has been greatly injured by the cold and dry weather, and perhaps this may account for its ripening so soon." The drought in this State was most distressing; and, by accounts received since the harvest, the crop must have suffered most severely. In the central portion of the State, towards the west, the crop is supposed to have fallen off one half; and towards the east, not less than one fourth. In the northwestern section, it seems to have been somewhat better, and it is thought may have been about equal to the crop of 1844. On the whole, we think it must be not less a decrease than 15 to 20 per cent. We think it probable that in some sections, where considerable wheat was raised, this estimate may be considered too large; but allowing every thing favorable, in the warm weather, for the earlier ripening of the grain, we cannot form any more favorable conclusion.

The drought also, as already mentioned in our extracts under "*The Season*," most severely affected the State of South Carolina, and the wheat crop there felt its influence. As early as April, in the Edgefield Advertiser and Charleston Patriot, we find mention of frequent complaints and fears entertained respecting the harvest; and the wheat crop, it is said, is "seriously damaged," "a failure," "very sorry." Nor did the prospect improve in May. The Greenville Mountaineer, Cheraw Gazette, Columbian, South Carolinian, and Edgefield Advertiser, all agree in representing the injury to be great. They speak of it as "short of the usual yield;" "not more than two-thirds of the amount annually harvested;" "seriously damaged and suffering (also) from a black blast;" "will be cut short, if not entirely destroyed." It is probable, however, that in the upper part of the State, towards the west, the yield proved "better than was anticipated;" the grain, also, though "the stock" was "low" in the middle districts, proved to be "good." Taking the whole State through, the crop must have fallen very considerably. According to the information we have derived from correspondents since the harvest in the northwestern part of the State, where not much is raised, it was about equal to the crop of 1844. In the northeastern portion it may have been a little better—say "10 per cent." In the central section it is thought to have fallen "30 per cent." on account of the drought, and in the section west of this to have been at least 15 per cent. less. It was, probably, about 20 per cent. less for the whole State.

In Georgia, as early as the 25th of April, we find mention of the ravages of the Hessian fly in the counties near Milledgeville. Says the journal published there: "We learn that the *Hessian fly* is in the *wheat*, in several of the neighboring counties, and that their ravages have been dreadful. Whole fields have been totally destroyed by this troublesome insect, and others will yield not more than a fourth of what was confidently anticipated some weeks ago. We have been told that in an adjoining county,

a wealthy farmer, who always plants largely in wheat, found that one of his wheat fields was totally destroyed by them, while the adjoining field (the two being separated by a worm fence only) was untouched. It has been remarked, too, that in straight lines, across whose fields from ten to fifty yards apart, the destruction would be entire, while the balance would present a wholesome appearance."

The following are some of the subsequent notices in May, and on: "The wheat crop in this county is very promising; we heard a farmer say on Monday that he would commence reaping in ten days."—*Marietta* (*Cobb co., Ga.*) *Advocate*, 14*th May.*

"While complaints have been made of an extensive drought prevailing in some parts of this and the adjoining States, we have had a fine growing season. The wheat crop will be about an average one."—*Marietta* (*Cobb Co., Ga.*) *Helicon.*

"The *wheat* crops, with the dry weather, and heavy frosts which fell about the middle of March, have been measurably destroyed. Many farmers in Lumpkin, Union, and Habersham, will not make the seed which they planted last fall."—*Dahlonega* (*Ga.*) *Watchman*, 22*d inst.*

"With all the complaints of dry weather, crops look very fine in Lee, Thomas, and Baker. The wheat crop has far exceeded the most sanguine expectations of the oldest planters in this county."—*Sav. Georgian, June* 2.

The information respecting the northwestern section since the harvest is, that the crop is thought to have been "25 per cent." owing to the "increased culture" given to this product, and the "better yield." From the central counties west of the Ocmulgee river, the report is not as favorable, as it is judged to have fallen off at least "one fourth or one-third" from that of 1844. The crop, therefore, in the whole State, is believed to have been not less than 15 per cent. decrease.

In some portions of Alabama the wheat crop is about the same as in the previous year, while in other sections the early frost materially injured it; and the decrease is variously estimated from "10 per cent" to "one-third."

In portions of Mississippi some wheat is raised, but it forms so small a crop, comparatively, that it is difficult to form any very reliable estimate of the yield.

The same is the case with regard to Arkansas, where, as the crop in the early part of the season appeared promising, and from the scattered notices gathered, it seemed to be quite good, we have felt authorized to allow about the usual rate of increase for the average crops.

The crop of wheat in Tennessee, so far as we are able to ascertain, was a productive one. The West Tennessee Whig says, "the wheat crop in that region turned out to be very good." A similar report is also made in a public journal by a correspondent at Nashville. From other information, we learn that in the northwestern section of the State the crop was probably twenty per cent. more than in 1844, while in the northeastern it has been estimated as high as forty per cent. increase. We place the average increase for the State at about twenty per cent.

Although the drought was felt in parts of Kentucky, yet we believe the wheat crop was, on the whole, a good one. In April and May we find the following notices:

"During a short excursion into the country, a few days since, we were much gratified to see the wheat crops look so fine. Should the blighting rust not again visit it before its maturity, there will be an abundance, and to

spare, raised the present year for home consumption."—*Lexington (Ky.) Inquirer.*

"The *wheat* will generally turn out well."—*Maysville Eagle, May* 24.

In another journal it is stated, as from a gentleman who has lately travelled through Franklin, Woodford, Fayette, and Bourbon counties, that "the wheat crops look well, with a prospect of a very heavy harvest."

Again, in June or July: "It is the universal remark, that there never was grown in Kentucky a better wheat crop than the present. The frequent rains lately have somewhat retarded the harvesting, but we do not learn that they have caused serious damage to the crop. Kentucky has for years imported considerable quantities of wheat and flour; but it is generally believed that she will export a surplus from the present crop."—*Frankfort (Ky.) Commonwealth.*

Some accounts speak of the prospect in Kentucky as bad. The editor of the Shelby News, on the contrary, says: "In passing through a portion of the northern and northwestern sections of old Shelby, we were delighted with the fine appearance of the wheat crop."

The Knoxville Register, of July 30th, states that "the wheat crop this season is an excellent one, the quality of the grain produced being, as a general thing, superior to that of any crop for several years past. If the season continues propitious, the crop will be unusually large."

This, likewise, corresponds with the information otherwise obtained. Thus, in the counties east and northeast of the central it is stated that, "in 1844 there was almost a total failure; but in 1845, an uncommonly fine crop," which is rated even as high as "75 per cent." In the section lying northeast of the last, our informant says: "The warm weather was a great advantage to the wheat, and so good a crop has not been raised in this section for the last twenty years; which many think is owing to the cold dry spring and the fore part of the summer." He thinks the yield at least thirty per cent. greater. In the southeastern part of the State the crop was fully "equal to that of 1844," if not still larger. The crop, therefore, may fairly be estimated at twenty per cent. advance on that of 1844.

A species of wheat called the Reed-straw wheat is mentioned in the Louisville Journal, and the farmers of that region are advised to give it a trial. The ears are said to be "large and full, and the grains plump and heavy." This kind, also, it is stated, "ripens two weeks earlier than the common sorts, and therefore escapes the rust," to which they are liable. It weighs very heavy, and ripened last year by the first of June.

The wheat crop of Indiana has been a heavy one. The notices of its progress, in general, are highly favorable. It is true, mention is made of frosts, and apprehensions were felt in some parts of the State as early as April and May, but these were proved erroneous by the subsequent harvest."

A letter dated South Bend, St. Joseph county, Indiana, May 1, says: "I have recently travelled through the counties of Kosciusko, Elkhart, Marshall, St. Joseph, and Laporte, in this State, and have the gratification to say that we have never had a better prospect of an abundant crop of *wheat* than we have now. Last year our wheat was nearly destroyed by the fly; at present it appears entirely free from that and all other evils."

The Cambridge (Indiana) Reveille, the Lafayette Journal, and the Wabash Courier, all speak of the crops in their respective vicinities as very promising.

"*Indianapolis, May* 9.—From every portion of our State we learn that the *wheat* crop never promised more abundantly than at present. Should the present anticipations of our farmers be realized at the approaching harvest, prosperity will again begin to smile upon us."

"The weather is now warm and dry. The *wheat* crop looks at the present time remarkably well; and should the season continue to be favorable, we may expect an abundant harvest. We have not yet heard that the fly has made any appearance in this section of the country."—*Centreville, Indiana, May* 14.

"We are happy to have it in our power to say that the prospects for an abundant harvest never were better than at present in northern Indiana. The *wheat* crop especially, which is our greatest dependence, promises an unusual yield to the farmer."—*Laporte Whig.*

As the harvest advanced, the statements are equally decisive. Thus, in June and July, the Goshen Democrat says, that "the wheat crop in northern Indiana has not been better during our residence in the State. It will nearly all be harvested and secured during the present week in good order. Elkhart county alone will have a large surplus for the eastern market. Some of our wheat fields average 30 and 35 bushels to the acre, and 20 bushels are a common yield."

"Wheat comes in briskly and finds a ready market; Pulaski, Fulton, Miami, White, Carroll, and Cass, have an immense surplus, of which between 250,000 and 300,000 bushels will probably find its way to this market. Such a time of almost universal prosperity among farmers was never before known in this part of the country." "We have no means of arriving at a correct estimate of the quantity, but those who know say it will be as large as was ever known before, if not larger."—*Logansport (Indiana) Pharos.*

"The Lafayette Standard of the 18th says: "Several lots of new wheat have already been sold in this market, at prices ranging from 62 to 65 cents. It is immensely heavy, and a most excellent article. The crops in this region will be most abundant—far exceeding in quantity and quality those of any previous year."—*July* 26.

From other informants, we are told that in the upper central counties, above the Wabash river and northwestern part of the State, the crop is thought to be double what it was the previous year, while by yet another person it is estimated at much more than double. Of the southeastern section, bordering on Ohio and the Ohio river, it is likewise estimated to be an advance of 100 per cent.; and it is stated that "the crop of last year was severely affected by the rust, but this year there was no rust or any thing scarcely to damage the crop. In the county of Dearborn, there was some damage by the *weevil*, but no general appearance of it. In the central section it is estimated to have gained "25 per cent," and in the southwestern "50 per cent," on the crop of 1844. Of the former part it is mentioned as a cause, that there was "increased industry, stimulated by the prospect of a market, and an increased quantity of land reclaimed from the forest state." Another informant, whose opportunities of information are better than usual, also speaks of the great increase of the crop throughout the State; and we feel authorized, by all we can learn, to fix it at "30 per cent."

A similar advance may be given, we believe, to the wheat crop of Illinois. It will be recollected that, in 1844, both this State and Indiana suffered severely from incessant and heavy rain, which destroyed large and fine crops

in prospect. The crop of 1845, though suffering somewhat in sections from drought, yet has had, on the whole, a very propitious season for growth and gathering. We give such notices of its progress as we have met with:

April 23d, the Chicago Democrat says: "The wheat crop looks favorable. All that is now feared is dry weather." Yet later: "The *wheat*, in general, looks tolerably well only; on some farms it stands thin upon the ground—probably in consequence of the extreme dry weather last fall, when it was sown."—*Quincy Whig, May* 7.

"We have made a short excursion into the country, and find the wheat crop in a very fine condition."—*Chicago (Ill.) Farmer, May.*

The Alton (Ill.) Telegraph says, that "the wheat in that vicinity looks well." So, in June, the Quincy Whig says: "From all parts of the country we have most promising accounts of the crops. The prospect of wheat is very fair; the stalk is not as thrifty as last year, but heads fill out well, and the grains are large."

"We have had several good showers of rain the present week. The corn and *wheat* in this vicinity begin to 'look up,' though a portion of these crops was entirely destroyed by the frost."—*Springfield Republican, June* 6.

In the Chicago Democrat, of the 10th June, we find the following: "The growing *wheat* still promises well, although, from the want of rain in the southern sections, the straw is light and the head uncommonly short."

Again: "Advices from western Illinois represent the *wheat* crop as very good. Although the stalks are not as luxuriant as usual, the heads are heavy and full."

"From present appearances," says the Warsaw Signal, "the crops in this section of the country promise to be unusually large. The season thus far has been favorable."

The editor of the Prairie Farmer, for June, says: "In our travels through southern Wisconsin, northern Illinois, and the Military tract, we have observed the *wheat* looks pretty well. The winter, that was late sown, is thin on the ground, and also the late sown spring, owing to the dry weather succeeding the sowings. But should the season be favorable, this will head out larger, and many fields will yield more bushels of wheat than that growing thicker. The straw is almost universally very short. The fly has done more or less injury all over the State, and it has become a permanent enemy to the prairie farmer."

Again, from the New York News: "The Alton Telegraph says: 'A field of wheat on Scaritt's prairie, in this county, was harvested on the 13th of this month, (June.) This is the earliest we have ever known grain in this country to be fit for the sickle.'"

"*Marseilles, Illinois, June* 25.—The weather, from being cold and dry, is now hot and sufficiently wet. *Wheat* looks well, and is fast ripening. One week more of good weather will insure a good crop."

"A gentleman who lately passed through the Rock river country informs us that the wheat crop never looked more promising. The quantity grown this season in northern Illinois will far exceed that of any former year."—*Albany Citizen.*

Again, in the Prairie Farmer of July: "Having just arrived at Springfield (23d June) from Chicago, passing through Du Page, Kendall, La Salle, Putnam, Woodford, Tazewell, Logan, Menard, and Sangamon counties we send a word of our own observations concerning the crops. The prospects now are, there will be an abundant yield of grain of all kinds. I

the four southern counties we saw numerous what fields that will be ready for the sickle this week, and we learn some were cutting in this county last week. Ten days of good weather insures a large crop through all this region, though the late rains, continuing for about ten days, have saturated the earth, and there is considerable danger of rust in consequence. A few hours of hot damp weather would ruin thousands of acres, that now promise twelve to twenty bushels. South of this, we learn they have harvested a good crop. We saw no wheat fields injured by the frost, or lodged, though we have been told there were some."

"Many of the farmers in this section of country last week commenced cutting their winter wheat, and immense quantities will be cut this week. We are pleased to hear, from every direction around us, that there has never been a finer crop. It is a common remark of every one that goes into the country, or that comes to town from the country, when speaking of the crops, 'I have never seen such wheat.' This is highly encouraging to our people, and must cheer up many an agriculturist whose crop had failed the last year or two."—*Peoria (Illinois) Press.*

"Our farmers generally, by this time, have harvested their *wheat*. The weather for the last three days of the week was quite favorable for harvesting, and the whole crop has been secured in good order. The yield is fully equal to the most sanguine expectations of the farmer, and the quality of the grain is very superior."—*Quincy Whig, July* 9.

Still later in July, the Springfield (Illinois) Journal of the 18th says: "Within a few days past, there have been heavy rains in this region of country. *Wheat* will turn out better than was anticipated."

"A traveller informs the editor of the Commercial Advertiser, Buffalo, that in Illinois he saw 40,000 acres of *wheat* in one body, divided only by cross-roads. The yield on the whole lot gave promise of something better than was seen last year."

"Since our last publication, the weather, although intensely hot, has been generally favorable to the harvest. The *wheat* is all saved, and will, it is believed, be of the very best quality; a small part only having been injured by the late rains."—*Alton Telegraph.*

Our information from other sources corresponds with the above, and is all favorable. In the section embraced from Peoria county to Jersey county, along the west side of the Illinois to the Mississippi, being the central western tier of counties, it is estimated that the increase above the crop of 1844 is equal to "50 per cent." "The last year the crops were bad; this year, fine." In the southeastern part, bordering on the Ohio and Wabash rivers, the yield is thought to have been "10 per cent. better;" in the southwestern, bordering on the Mississippi, "25 per cent. increase;" and in the northern, and along Lake Michigan, also, "25 per cent. more." We put the estimate for the whole State at 35 to 40 per cent. increase. Some have placed it much higher; but we are aware how liable all are to place their estimates too high.

One writer in a public journal says: "It is estimated that Illinois alone will furnish a surplus of 8,000,000 bushels of wheat this season. An advance of only ten cents per bushel would more than pay the whole interest on her debt; and it has already advanced more than twenty."

We cannot agree with this view, if it is meant by it that the whole of this amount is raised by this State, as it would make the Illinois crop as much as 16,000,000 of bushels. The crop of 1839, according to the census, was

but a little over 3,000,000; and the variations of the crop have been large since then. The crop of 1842, (which was a fine crop,) according to the best estimate we could gather, was only about 5,700,000; and in 1843 and 1844 it was much reduced. The crop of 1845 was a very fine one—probably above one third more than in 1844.

An agricultural journal says: "We learn that 30 bushels to the acre is no uncommon crop this year through the north of this State, and we presume that the same is the fact in sections adjacent."—*Prairie Farmer, August.*

It will be recollected that the wheat crop of Missouri, in 1844, was greatly injured. The accounts for the year 1845 are much more favorable. In May we find them as follows:

"In the counties of St. Charles, Warren, and Montgomery, the crops of *wheat* are well set, and in a flourishing condition; the growth was a little retarded by the dry weather of the spring, but the recent rains have given it fresh life; and should the season continue to be favorable, very fine crops may be expected." "The present prospect for an abundant *wheat* crop upon the Illinois and upper Mississippi is said to be flattering."—*St. Louis New Era, May* 5.

"*Crops.*—From present appearances, we are told that the crops of *wheat* and corn on the upper Mississippi and Illinois promise an abundant harvest. The *wheat*, although retarded somewhat in its growth by the dry weather, in the early part of the growing season, has been brought out by the late rains, and looks fine, and promises to do well."—*St. Louis New Era, May* 20.

"Extract from a private letter to one of the editors, written from the southwestern corner of Missouri: 'The prospect for *wheat* in this country is very favorable. I hear all the farmers say they have never seen more wheat growing, or look better; and if their expectations should be realized, and not marred, there will be sufficient flour manufactured here to supply all the Arkansas river district.'"—*Van Buren* (*Arkansas*) *Intelligencer, May* 24.

In June, some apprehensions seem to be entertained of rust from the rain. A correspondent of the St. Louis Republican, writing from Warsaw, Missouri, says: "The wheat crop in the southwest part of the State is very short, and everywhere uneven; most of it is not half the usual height."

The Republican adds: "We have similar reports from other parts of this State."

The St. Louis New Era says: "The rains of late have been frequent and heavy, and will give a very desirable impetus to the general growth of vegetation. It is feared by some that the *wheat* crop may be injured by the rust in consequence of the continued wet weather."

"We begin to despair of the *wheat* crops, (says the St. Louis Republican, of the 27th ultimo.) It has rained more or less for the last fifteen days; and as yet there is no prospect of settled clear weather. The crop of *wheat*, which, until the commencement of the rain, promised an abundant yield, is greatly injured, and must soon be wholly destroyed, unless a change in the weather takes place. That which was cut just before the rain is, of course, lost. This will be a sad blow to our farmers, and must sensibly affect all other branches of business and trade."

Still later, and in July, the St. Louis Republican says: "In our own State the only apprehension seems to be, that the heavy rains of the last week may prove injurious to the wheat, which is ready for harvesting, and a small

portion of which has already been cut. A few days of dry and not too warm weather will place it out of danger."

"The last few days of dry weather have enabled the farmers to harvest their wheat; and it is free of rust, which was much feared."—*St. Louis Republican, July* 2.

Again, from the same paper: "The yield of *wheat* will probably exceed that of any previous year."

In the New York Farmer, it is said: "A letter from Gallatin, (Mo.,) as early as July 6, says: 'The harvest is just over; the *wheat* is excellent.'"

The Fulton (Mo.) Telegraph also says: "The *wheat* crop, from present appearance, will be more than an average; and, in another journal, speaking of Jackson county, it is said: "The *wheat* crop has been harvested, and is more abundant than usual."

Subsequent to the harvest, the following statement is also made in the St. Louis New Era: "The new crop has just commenced arriving freely; and, should the upper streams continue even in their present difficult stage for navigation, we may expect to see, in the course of three or four weeks, large quantities of wheat pouring into the market; even at this early period, there are thousands of bushels of the new crop lying at the landings along the Illinois, upper Mississippi, and Missouri, waiting shipment. All the boats which have reached this port from above, for three or four days past, have come down with as much as they could possibly get along with; and many of them, particularly those from the Missouri and Illinois, had to refuse more wheat than would have loaded them twice over in a fair stage of water. The *wheat* harvest has, indeed, been a magnificent one. From every quarter the cry is, *plenty;* on the Missouri, upper Mississippi, and Illinois, the average yield over the crop of last year will be full 33 per cent.; and, in many sections of the county, full 50 per cent.; add to this the superior quality of the grain, which appears to be uniformly of nearly the same quality, and there must be a great surplus. How, when, and where it is to be disposed of, remains to be seen."

From the above accounts, we believe we may fairly place it at one-third more than the previous year, in which, as it will be remembered, it suffered so largely.

From none of the large wheat growing States do we receive more encouraging accounts of this crop than from Michigan. Indeed, its whole progress seems to have been unusually good. The year 1844, it will be remembered, was a great contrast to this, and that the crop suffered most severely from the rust. We give the history of the crop as we have gathered it, commencing with March. The weather was cold and backward, but it is said "our great staple never looked better at this season of the year, and there is every prospect that the labor of the husbandman will be as favorably rewarded as could be desired."

In April, the Marshall Exponent says: "There never was a fairer prospect of a good wheat crop than there is at the present time. We have inquired of farmers in almost every town in the county, and get the same answer: 'it looks well—never better.' No insect has made its appearance yet, and the grain may now be considered secure from that danger. We rejoice to learn from our exchanges that crops look equally well in every part of the State."

Again: *Oakland county, Michigan.*—The editor of the Oakland Gazette says: "While jaunting through the middle and northern parts of this

county on the 12th inst., we observed that the *wheat crop* appeared better at this season than it has for many years past. The prospect is fair for a very large crop; and, with dispensations which a Divine Providence alone can bestow, we think there will be more wheat produced in those portions of the county the current year, than at any previous year since its settlement."

So, in May: "The *wheat* crop never looked better in this region, at this season of the year, than at present. There are some fields this side of the county house—we believe on Judge Thompson's farm—that are well worth a journey from the village to behold."—*Adrian* (*Mich.*) *Expositor.*

"In this section the *wheat* is growing very rapidly; too much so, it is feared by some."—*Marshall* (*Mich.*) *Expounder.*

"The wheat fields (except in that part of the country visited by hail storms) present a glorious appearance; and unless some accident should happen to it before harvest, the crop will be immense. We hear no complaint of the ravages of the fly this year, as we did last."—*St. Joseph* (*Mich.*) *Advertiser.*

"The prospects of the *wheat* crop in Michigan, as our advices prove from all parts of the State, were never better than at present. Even on land heretofore considered almost barren, our wheat appears exceedingly rank, and nothing short of an uncommon drought can now destroy it."—*Jackson Gazette.*

Kalamazoo, Michigan, May 16.—*Wheat.*—"Never since our residence in the country have we seen the promise for a heavy wheat crop as good as it is now. Not a poor piece have we seen yet. If nothing should happen to it before harvest, all complaints of hard times, scarcity of money, &c., will be at an end. Our prairies challenge the west."—*Telegraph.*

"The *wheat* in this part of the country looks well. We have never seen it better; and we hear similar accounts from most parts of the State."—*Ann Arbor* (*Mich.*) *Journal.*

Correspondence of Livingston and Wells's express, No. 10, *Wall street.*—"*Shiawassee, Michigan, May* 19, 1845.—The *wheat* crop promises fair, and I am told there is at least one third more *wheat* on the ground this season, than there was last."

In June: "From all parts of the State, with few exceptions, we hear the most encouraging accounts respecting the prospects of the incoming crops. This is peculiarly gratifying at this time to the farmers of Michigan. Last year the wheat crop in this State was very small, while our neighbors in Ohio, Indiana, and Illinois, reaped an average harvest."—*Ann Arbor Argus.*

Again: "*Ann Arbor, Michigan.*—The crops, after all, look well, especially the *wheat.* The spring crops were mostly cut down, and in some cases twice or thrice; but the fine growing weather since has restored them. The farmer's prospects are good and promising."

A farmer from the country informs us "that fears are entertained that the late frosts have ruined the prospects of a good wheat crop."—*Detroit Free Press, June* 2.

At a later date, the Detroit Advertiser says: "We learn from various sources that the *wheat* crop has not probably suffered materially, or at least generally, in this State, from the late frosts. But the drought has sensibly affected it in several places." The Jackson Gazette, and the Coldwater Sentinel, respectively, after alluding to the drought and frosts, speak of the

wheat as "uninjured," and affording promise of an excellent harvest. The editor of the Michigan Farmer, under date of 15th June, says: "From every quarter we hear the most encouraging accounts of the condition of the *wheat* crop. The papers of every section of this State unite in the anticipation of an abundant harvest. The wheat insect appears nearly to have intermitted its ravages. The crop emerged perfectly unhurt from a changeable, snowless winter; and, since the opening of spring, with the exception of one or two seasons of drought—which, however, has not been very severe—the progress of the crop has been of the most promising description."

In the month of July, and during the harvest, the accounts still continue to be cheering, like the following:

"We are informed by a gentleman, direct from Michigan, that the wheat crop in that State is better than ever before known. It will be mostly harvested this week, and will, therefore, be housed in good condition, as the weather is warm and dry."—*Albany Argus.*

"The *wheat* crop in this State is said to be nearly double in quantity that of any previous year." "The Detroit Free Press of the 16th instant, gives the following account of the harvest in that State: "In Michigan, we are able to say, so far as we have heard, the *wheat* crop was never better in quality, or larger in quantity. The farmers in the western portion of the State are already in the midst of the harvest; and in all parts they will commence in the course of this week and next. We shall have a large amount for exportation." "The harvest has commenced in this section of the State," says the Marshall Expositor, "and the crop is coming in nobly. It will be the best wheat crop ever harvested in this country. We have heard the average estimated at 25 bushels per acre; but this is probably too high. Last year the average was said not to have exceeded seven bushels per acre. The berry is said to be plumper and the wheat heavier than in any former year." "Some farmers have commenced harvesting their wheat, and the crop will quickly be in market. The straw is rather short, but the ear well filled, the berry plump, and the crop will be full an average one. The surplus in Michigan will probably be twice as great as last year." "The farmers of Michigan are now in the midst of their wheat harvest, and we are happy to say that it bids fair to prove the richest harvest ever gathered in Michigan."—*Detroit News.*

"A friend of ours, who is a practical farmer, and, we may add, a member of Congress, has just called on us on his return from Michigan, having travelled in that State in various directions, and having had an excellent opportunity to inspect the crops. He says the crop of wheat was never so good or abundant as it is this year. As an evidence of it, a large portion of the wheat will weigh sixty-five pounds a bushel, and the product will be one third greater than the largest crops ever raised in that fertile State. The above authority may be implicitly relied on."—*New York paper.*

The Grand Rapids Inquirer says, that "in the county of Ionia, in Michigan, there are this season over 20,000 acres of *wheat*, all in first rate order, furnishing assurances of a large crop."—*June.*

The accounts from Michigan are of the most encouraging kind. A letter in the Detroit Advertiser, dated Pontiac, Michigan, August 11, says: "If the accounts are anything like correct, the quantity of *wheat* raised in this section of country alone must be prodigious. In the town of Washington, Macomb county, I am told it is nothing remarkable for one farmer

to thresh his two thousand bushels of wheat; and one man, I am assured, has nearer five than three thousand bushels. I saw a farmer from the border of Lapeer, who told me he was only 'a young beginner,' but reckoned upon his one thousand bushels of wheat, at least, this season—some of his land bringing him as much as forty bushels to the acre."

The American Agriculturist for November last gives a letter from a correspondent, which contains the following remarks respecting the wheat crop of Michigan:

"Wheat is the great product of the State; and on this the farmers principally rely for their available exports. Never did their efforts receive a greater reward than the present season. The estimate of several judicious citizens is, that the crop fully averaged 20 bushels per acre over the State. I was informed of a wheat field containing 100 acres, which averaged over 45 bushels per acre, and one measured acre of which produced over 60 bushels. A cargo of this year's crop, from Michigan, averaged one barrel of the best superfine flour for every 244½ lbs. of wheat."

"*Great yield.*—Henry Jones, of Young's prairie, Cass county, raised on one acre of ground, this year, *sixty-one bushels* and *twenty-five pounds* of wheat. This is the largest yield we have heard of in western Michigan. A large number of fields in this section have yielded from 30 to 45 bushels to the acre this season. Perhaps the world cannot furnish a finer or more productive country for grain than the St. Joseph valley. When we cast an eye back to the land of our nativity, where, eighteen years since, we followed the plough, among the rocks and stones of Connecticut, where 15 bushels of rye to the acre was considered a fair yield, we cannot but wonder how mortal man can be content with such an abode, when the rich and fertile soil of the west holds out inducement the most inviting to all."—*Niles Republican.*

From other sources of information we also learn that in Oakland county the wheat crop is the "largest they ever had." In Ionia and Berrien "unusually large;" as a specimen of which, it is stated one farmer has 106 acres which will average "30 bushels to the acre;" and, of the whole State, "more wheat will be harvested than for three preceding years." In the southwestern quarter of the State, bordering on the lake and on Indiana, the estimate is "50 per cent. more." The fly and wet weather injured it in 1844; in 1845 it was, in all respects, favorable. In the central eastern section, lying on the boundary line, it is likewise estimated at "50 per cent. more."

Another informant in the southeastern section says: "Three times more than in 1844." The editor of the Michigan Farmer says: "The returns from different counties vary from 25 to 40 per cent. In one county only, from rust, the falling off is said to have been 75 per cent.; never so beautiful a yield; scarce a bushel is brought to market that does not considerably overrun in weight, and the flour produced from it is of superior excellence." He thinks the amount to be more than double the former year. We have, however, after full consideration, fixed it about 75 per cent. more. This we have done in view of the increase, not merely from the more favorable season, but of the lands newly brought under cultivation, &c.

A new insect in that section is mentioned in one of the public journals, as follows:

"The Michigan Farmer notices a new wheat insect found preying upon the wheat in that State, and which is described as follows: It is the product of a small greenish fly, about three sixteenths of an inch in length.

The larva is a white worm, one-fourth of an inch long, ribbed, without feet, with two forked black lines on its forehead, and in some cases a streak of light green extending lengthwise. The worm is found in the straw just above the upper joint, where it devours the juices which would otherwise ascend to the head. The heads of wheat denote its presence by turning white prematurely, when the grain is in the milk. In one instance nine eggs were found in a single straw; one of which had just hatched. Have any of our readers seen any such insect?"

The increase of Iowa and Wisconsin, by the influx of population within the past year, is said to be great, and due allowance must, no doubt, be made for the additional quantity of land brought under cultivation. Besides this, their crops of wheat were evidently much greater than in the year 1844. As early as May, the prospect is represented as "promising a very heavy yield." The Bloomington Herald speaks thus, also, of the crops of Linn, Cedar, Muskatine, Washington, and other portions of Iowa, which "bid fair to yield an abundant harvest." The Lee County (Fort Madison, I. T.) Democrat of the 17th instant, says: "We have conversed with many of our farmers during the present week upon this subject, and have been assured by all of them that grain of all kinds looks remarkably fine, and promises an abundant harvest. Many of them say that for several years past they have not seen crops look so promising as they do at this time."

As the harvest approaches, and subsequently, we are furnished with the following notices of the crop: "The Miner's Express of the 4th of June, published at Dubuque, Iowa, says: 'The crops in our Territory generally present a most promising appearance. The prospect of the *wheat* crop is especially flattering. It is estimated that there will be more wheat harvested in Iowa this season than during the two preceding years.'"

Iowa.—The reports from this section of country are very flattering. The *wheat* crop is very promising, with every indication of an abundant harvest. The crop of *wheat* has been gathered, and the Bloomington Herald says: "A crop full one-third larger than usual will soon be in market, and we learn that some of our merchants are making contracts at fifty-six cents per bushel. We are further informed that the article is considerably superior to that of last year's production." Since the harvest, also, we learn from one well qualified to judge, that the crop was much larger than that of the preceding year, as "more land was tilled by the old settlers; the increase of population was greater than previously known; the season was more favorable; the produce per acre more, and the quality much better—in the last two particulars, better than for eight years." We believe that the advance was not less than one-quarter, or perhaps one-third. Mention is made of a new insect, which, it seems, is doing great injury to the wheat crop sown for 1846. The following is the account to which we allude:

"*Destruction of wheat.*—By a letter received by a gentleman in this city from Col. G. M. Kinkle, of Buffalo, Iowa, dated October 23, 1845, we learn of the appearance of a curious insect, which is doing great damage to the wheat. He says: 'Notwithstanding the luxurious harvest of this season, there is every appearance of a severe pestilence of a curious kind here. About the 1st of September there was a singular kind of insect made its appearance in most of the farms over the country. Its first appearance is a small black bug on the surface of the ground, and on some farms the surface for some inches deep would seem to be alive with them. Some farmers, who have sandy land, say it seemed as though every grain of sand was

becoming alive. In a few days after their first appearance they climb upon the corn, wheat, or whatever green thing is in their way, and then turn into a small fly about half the size of a house-fly, and suck the substance from the stalk of the grain until it withers away. Many crops of fine winter wheat, which came up and looked prosperous, have been entirely destroyed by them, so that the farmer has been compelled to sow it over again. The curiosity of it is, no one ever saw such a bug or fly before. It baffles the ingenuity of all to tell what it means. Nothwithstanding we have a frost every night, and have had some hard freezes, yet, as soon as the sun is up and warms them, they go to their work of destruction again. They not only eat the young wheat above ground, but kill it at the roots. If they increase another season as they have this, they will sweep every thing before them.' "—*Philadelphia Ledger.*

The following notices give us some idea of the state of the crop in its progress in Wisconsin:

Extract from a letter dated Troy, Walworth county, Wis., March 13, 1845: "The *wheat* crops throughout this region present a most promising appearance; and, if no accident happens, we shall send an increased quantity to the eastern market the coming season. More ground has been sown in this, and the adjoining counties, than in any preceding year. I think Walworth alone will spare from 100,000 to 150,000 bushels. Emigrants are fast pouring into the Territory; but as the government land which is of any worth is all taken in this section, the tide is turning northward and more westerly. We have had fine spring weather for the past few weeks, and everything indicates an early opening of the farming season with us." (Troy is about 30 miles S. or S. W. of Milwaukie, and about the same distance N. W. of Racine.) In May also: "The growing wheat never promised fairer at this season of the year than it now does. It has a very luxuriant growth. It is believed the crop is out of the way of the *fly* and other insects; and there is now the fairest kind of a prospect of an early harvest and an abundant yield. It is calculated that at least three-eighths more land is in wheat this year than last; so that it is a tolerably safe calculation to estimate the export of wheat from Wisconsin of the growth of 1845, at 400,000 bushels."—*Racine Advertiser, May* 20.

"It is stated in the Platteville (Wisconsin) American of 2d instant, that the army worm is committing great ravages on Major Rountree's meadow, and on other farms in that county, where they have done considerable damage to the *wheat crop*. We have not heard of this army worm's having invaded either the *wheat* or grass fields in Racine, Walworth, or Rock counties."—*Racine Advertiser.*

From all parts of the Territory we learn that the *wheat* looks finely. "Never, (says the last Milwaukie Sentinel,) it is said, was there a fairer prospect for a large crop of *wheat*, than there is the present season."

"From all parts of the Territory we learn that the *wheat* crop looks fine, notwithstanding the open winter, and seemingly unfavorable weather until the opening of spring. Wisconsin is the surest wheat country in the world." *Milwaukie Courier.*

So, in June: "In Wisconsin the wheat crop is said to be uncommonly fine. The impression we receive from the various accounts which reach us is, that, in the country at large, the wheat crop is not likely to be an average one; though, taking into account the large quantity that remains

over from last year, there can be no lack. In dry sasons, the stalks yield more seed in proportion to the straw than in wet ones."

"*Milwaukie, June* 25.—The recent showers we have been favored with throughout the Territory were as beneficial as they were acceptable, and have advanced the crops one-third, and our farmers predict that they will have a better crop by one-half than ever before. Wheat at present averages six feet in the fields."

And yet later still: "The Wisconsin reapers are in the field gathering in as good a crop of *winter wheat* as was ever produced in the Territory. One-third, if not one-half more ground has been sown this year in wheat than in any former year; and the yield will be at least as good as at any previous period. The *spring wheat*, which of course ripens some two or three weeks later than the winter grain, also promises to yield an abundant crop."—*Racine Advertiser, July* 15.

"The editor of the Green Bay Republican makes a favorable report, from personal observation, of the crops in northern Wisconsin, in the upper country, bordering on the Fox river valley. *Wheat*, corn, oats, and barley are better than ever before. The *wheat* is heavy and free from smut."

"It is stated by the papers in the Territory, that the last harvest has been the largest and most productive one to the farmer that has ever been gathered in the country. The surplus wheat raised will amount to an immense quantity—Rock Island county having over half a million bushels surplus, and Walworth county an equally large yield. The prospects for next year are still more flattering; double the amount of wheat has been sown this fall that there was the last; and, as the weather so far has been unusually propitious, the young grain throughout the Territory has the best possible appearance. From the quantity of new land broken up and sown in Rock county, it is estimated that the surplus yield in that county alone next year will amount to one million of bushels."

The following is from the Tribune of September 10th: "We have often heard of the prolific crops of wheat in Wisconsin, and the facility with which settlers are reimbursing their original outlay, but the following from the Racine Advertiser goes ahead of all previous operations. It says that two farmers from Jamesville, in Rock county, whose farms adjoin, last fall had conjointly 200 acres of prairie broken and sown in wheat; the work being performed by two young men, with ten yoke of oxen, and two boys to drive, in a few weeks. These 200 acres of wheat have recently been cut by means of a machine, occupying only 12½ days, with an extra expense of fifty cents an acre for binding and stacking. The wheat turned out an aggregate of 5,000 bushels, worth $2,500, or an average of 25 bushels to the acre. On Friday the owner came to Racine with two wagons loaded with an aggregate of 205 bushels of wheat, which he sold to Mr. Richmond at 62½ cents the bushel."

The following is from the Tribune of September 15th, in a letter dated Dubuque, September 1st: "The crops in the Territory are unusually fine. *Wheat* has never been equalled in 'the memory of the oldest inhabitant.' The increase of the wheat crop of Wisconsin may therefore be rated as high as that of Iowa."

The wheat crop of New England, being raised in small fields, and not properly a staple to any of these States, is, on this account, estimated with more difficulty than in those States where it necessarily attracts more attention. In the more northern sections, the varieties of spring wheat are

the principal ones the culture of which is attempted. The weevil and the worm are the subject of complaint in Maine; and, owing to the ravages of the former insect for some years past, the farmers have been so much discouraged as to discontinue raising this crop. The Maine Farmer states that the crops in Piscataquis county "will not turn out so well as was anticipated. The wheat crop has suffered much from the ravages of the weevil—to such an extent, in fact, that many farmers have not considered it worth harvesting, and, consequently, have mowed down entire fields of it, curing the same for foddering purposes."

The Bangor Whig says, that "the wheat crop in that vicinity is much injured, and many fields ruined by the weevil and rust."

In some parts it is thought to have been ten per cent. better. As the crop of last year (1844) was better than ordinary, we believe that a deduction of five per cent. must be made for this year's crop. The same was probably the case in New Hampshire.

In Vermont, we are told that, while in some parts of the State the drought seriously affected the crop, so that it fell off probably twenty-five per cent., yet, taking the whole State, there was probably an average crop, which would be an increase of about ten per cent. on the previous year. One informant writes: "Wheat, in 1844, was best at the north, while at the south it was less in quantity and meaner in quality; in 1845, it is best at the south; and as the population is mostly at the south, there can be no doubt that ten per cent. more than last year is not a high estimate." We believe this to be a correct conclusion, and have accordingly, as it corresponds with what we can learn respecting the general crop of the State, placed it at ten per cent. increase on the crop of 1844. Complaints of the weevil are likewise made. In the lower part of the State there has been some improvement, however, in the culture, and the grain of Windham county is estimated at thirty per cent. more. This is attributed to the application of lime and ashes, and the selection of soils which contain magnesian limestone, by which tolerable crops have been secured.

From the Boston Cultivator, also, we learn that the wheat crops are "uncommonly large and fine in the vicinity of Burlington"—while, in the Maine Farmer we are informed that the crop has "come in well," and there is an "abundance of wheat." In the northeastern part of the State, however, owing to the ravages of the weevil, it is thought to have fallen off considerably. Taking the State through, we suppose it may be considered at about ten per cent. gain on the crop of 1844.

The wheat crop of Massachusetts, it is believed, was a small gain. In the upper middle section of the State the yield is variously estimated in different towns at from "ten to twenty-five and thirty per cent. more." In the southern corresponding section, at "five per cent. less." In the western part of the State, "twenty-five per cent. more." A good judge residing there says: "The wheat crop, as compared with that of 1844, is one-fourth more, and we attribute it, in a great measure, to the favorable spring months. The weather not being very warm, and a suitable quantity of rain, winter wheat came forward with great rapidity, and, without a check, ripened for the harvest. Spring wheat (which is the greater crop) was early sowed, in consequence of the ground being ready for the plough much sooner than usual. Notwithstanding that some few pieces were affected by the drought, we have had a better crop than for many years previous, and the insect worked much less than years before." In view of the statements respect-

ing the crop, therefore, we place it at an increase of fifteen per cent. on that of 1844.

The crops of Rhode Island and Connecticut seem to have been very similar with those of the adjoining States. In the former, it was probably about ten per cent. more, and in the latter about fifteen per cent. advance on the crop of 1844. In the Albany Cultivator for November last, Mr. Claudius Allen, of Cheshire, Connecticut, writes respecting wheat as follows:

"To encourage the farmers throughout New England to sow more *wheat*, I can state that there has been more or less of wheat sowed on my farm for forty-five years, and there have been but two or three years, at most, when there has not been a pretty fair crop. In 1836 or '37, when there was a great scarcity of wheat throughout all the States, there was here an entire failure. On about four acres, I did not receive my seed sown that year. Since then the crops have been very good. For fifteen years that I have owned the farm, there has no insect of any kind injured the crop at all, that I am aware of. This year's crop is superb, weighing 62 pounds to the bushel, and very plump. I generally soak my seed in strong brine, made of common salt, with saltpetre, ten or twelve hours; then mix with slacked lime or plaster of Paris. This season I have sown on seven acres ten bushels of seed, raised near Seneca lake, New York. I generally change my seed once in three or four years."

The State of New Jersey raises considerable wheat, and the last crop was much better than that of the preceding year. The notices given during the harvest, and the information since received, authorize the advance of 15 or 20 per cent. on the crop of 1844, which was less than an average one. Thus—

The Salem Messenger says: "During the last week our farmers were in the midst of harvest. The golden grain, which a few days since was waving far and wide over many a field, has bowed its head to the sickle of the merry harvester, and been gathered into the barns of the husbandman. Scarce any one complains of a short wheat crop."

The Somerville (N. J.) Whig says: "Last week some of our farmers were in the midst of their harvest, and had a few favorable days in which to gather it. Grain has a clean and plump appearance, and the yield is generally good."

In the central counties, stretching across the State, the crop is said to have been full an average one. Further north, it is estimated to have been 25 per cent. more; as more was sown, and it was not affected by the rust or fly.

Similar was the condition of the crop in Delaware. As early as May, it is stated, in the Wilmington Journal, that "the prospect of an abundant wheat crop was never so flattering;" and this promise seems to have been fully realized, and the grain was harvested in fine order, and above an average crop. There was doubtless at least 20 per cent. more than in the previous year.

We notice in an agricultural paper the following statement respecting a fine yield of wheat: "Edward T. Bellah, esq., of Brandywine hundred, Delaware, harvested the past season 358¾ bushels wheat from 9 acres, being 39¾ bushels to the acre. He manured the field in the spring, planted corn, cut off the corn, sowed it in wheat, and fluked it in both ways among the corn roots, and gave it no other dressing except to sow 39 bushels bone dust over one acre, which he did not think better than the rest."

Mr. J. Sampson also raised 103 bushels on $2\frac{3}{4}$ acres; and on another field, 2 acres, was raised $37\frac{1}{2}$ bushels to the acre. This last land, it is said, a few years since would not have yielded more than five bushels to the acre, but was improved by two hundred bushels of shell marl and ten horse-cart loads of compost, consisting of the refuse of skin dressers, glue boilers, &c.

The crop of wheat in the District of Columbia partook much of the character of that of the adjoining States, and, as a whole, was a good one.

The wheat crop of Texas, so far as we can learn, was abundant; but we have no means of estimating the amount of the same with any degree of reliance on our conclusions.

In addition to the accounts and estimates already given, it may be well here to subjoin some general views of the wheat crop throughout the country, taken from the public journals since the harvest.

The Albany Argus estimates the wheat crop as follows; which, as will be seen, corresponds pretty nearly with our own independent deductions:

"First, as to the great northern staple, wheat, the crop is undoubtedly a large one—more than an average—and it has been secured in excellent condition. This is the tenor of advices from all quarters. Even in Ohio, where the wheat crop is probably less than an average, the wheat is very clean and the berry very white. We hear neither of rust nor smut. Though the farmers have lost in quantity, they have undoubtedly gained in quality. In Michigan, Illinois, Wisconsin, and Iowa, the wheat crop is magnificent. Every thing has been favorable. So likewise, we understand, is the wheat crop in Pennsylvania. In Virginia, Maryland, North Carolina, and Georgia, it has been affected by the drought—some say so seriously as to shrivel the berry. In Tennessee, Kentucky, and Missouri, the crop is a noble one. In New England and New York, it is probably less than an average one."

Similar, also, is the conclusion formed by the editor of the Journal of Commerce:

"*The Crops.*—Within the last two or three weeks we have travelled 1,000 miles in the State of New York, and every where have made it a point to observe and inquire after the crops. The uniform testimony in regard to *wheat* is, that the crop is beyond an average. We, however, saw many fields which did not come up to our expectations, while others were as good as could be reasonably desired. Passing into Canada, we found the wheat crop there also very fine. Gentlemen from the interior gave the same account. We also saw persons from Michigan, Wisconsin, Ohio, Illinois, and other western States. Even in Ohio, the crop is now thought to be a full average. In Michigan, Wisconsin, and parts of Indiana and Illinois, it never was surpassed. The accounts from Pennsylvania are also favorable. In Virginia the crop is a full average, and in Maryland more than an average. To make a long story a short one, it may be said, in general, that the *wheat* crop of the country is one of the *largest* in quantity, and best in quality, that ever was gathered."

Some of the public journals have estimated the whole wheat crop as high as 125,000,000. We believe this is very much too large, and that it will not overgo 107,000,000. We prefer to fall short than to exceed the actual amount; and, by as careful review as we have been able to make, we have accordingly fixed it, as in the table, at 106,548,000 bushels.

As a general remark, however, it may be said that, in its weight and ap-

pearance and fitness for use, the crop is at least 10 per cent. better. The excellence of the crop, as a whole, seems attributable in a measure to the cold spring and the warm weather immediately succeeding, by which it was protected from the fly and rust, ripened finely, and was gathered in free from damage by unpropitious harvesting. If we might hazard a conjecture, also, we should say that the seed now in the ground being free from insects, the crop of the next year, if the weather proves favorable, will be much improved. It is evident that there is a large surplus of wheat in our country; and the vast quantity which has been poured forward to the Atlantic ports from the western country shows that this surplus has been providentially directed at a period when it cannot merely aid in feeding our own population, but also those who are starving abroad.

While collecting the notices of the crops, we have met with a variety of articles in the agricultural journals and newspapers of the day, relating to the insects and diseases affecting this product. Some of these, and also remedies against them, we subjoin, either in whole or substance, believing that they may be useful as memoranda to the agriculturist; and in some, if not in all instances, when more thoroughly tested, may receive confirmation.

The instances recorded, which have fallen under our eye, of the prevention of smut, (especially the dust or pepper brand, as it is sometimes termed,) by brining and liming, are frequent. One of these we find in a letter to the editors of the National Intelligencer, from C. B. Hamilton, near this city, in which the crop from seed which had not been so prepared was destroyed by smut, while that which had been so prepared remained untouched. The Hon. William Carmichael, also, in a note to the American Farmer, refers to the experiments of M. de Bombasle, who used 18 lbs. of Glauber salts to 22 gallons of water, as a steep; following this with placing his seed-wheat in a bed of quick-lime (slacked just before use) on his barn floor, and stirring it up so as to cause the lime to adhere to the kernels of grain, and then spreading it out to dry, not leaving it more than three days before planting. Mr. Carmichael states that he has tried the same plan, and found it successful. Mr. W. Rayley, of Aurelius, Washington county, Ohio, states to the editor of the Ohio Cultivator, that he has used brining for sixteen years, and thus secured his wheat from the wheat-fly; while his neighbors, without this preparation, have been often troubled by it. A similar testimony as to its efficacy is given in the same paper by A. Wattles, of Chickasaw, Ohio, who says that his limed wheat is one third heavier than the other. The following are some of the remarks of the editor of the Ohio Cultivator on the subject: "*The mode of preparation* is as follows: (it can be varied to suit convenience)—One or two days before sowing, put the seed into a vat or box, then take strong brine (such as is used for preserving meat) and heat it as hot as you can bear the hand in, for five seconds, and pour this over the wheat, stirring it the meantime with a scoop or shovel till the whole is completely wet; two or three quarts of brine is sufficient for a bushel of wheat; let it stand a few hours to drain, then spread it on the barn floor and sprinkle it over with fine slacked lime; stir it and add lime until every kernel appears white and dry: it is then fit for sowing. It will only require about one bushel of lime to ten bushels of wheat.

"Another simple method of brining wheat is, to put the seed into a bushel basket, and stand this on a common wash tub with slats across, then pour on the brine, shake the basket, and allow the surplus brine to run through

into the tub below, to be used over again. The *rationale* of such preparation is this:—First: it is believed that the seeds of disease, as smut, &c., and the minute eggs of insects, as the weevil, exist on or within the kernels of the grain, and are destroyed by the brine and lime. Second: it is known that salt and lime are highly conducive to the health and growth of the wheat plant, especially on soils that have been exhausted of their mineral salts, and where these necessary elements of the wheat crop are not restored by good tillage."

A person writing to the editor of the Albany Cultivator from Laurens district, S. C., says: "I have been soaking my *seed wheat* in bluestone, (sulphate of copper,) one pound to five bushels—water enough to cover; leaving it to soak for about twenty-four hours, and then rolling it in ashes, and have found this method a full preventive against smut. With the same effect I have tried, for five bushels of seed wheat one pound of saltpetre, two pounds of Glauber salts, two pounds of copperas; and I never had smut in wheat when I used either of these preparations."

The editor of the Genesee Farmer gives an account of the appearance of an insect in some wheat which Gen. Harmon, a man thoroughly acquainted with the culture of this product, supposes may be connected with the causes of the malady—Thus: "We saw yesterday, at General Harmon's, twenty or more small brown bugs, which have lately emerged from kernels of smut wheat, leaving a small opening in the grain of smut, like the aperture in the pea, through which the pea bug escapes. General H. placed full heads of smut, before the wheat was ripe, into a closely wrapped paper, for the purpose of seeing if any insect would be developed in the heads of smut. The insect and heads were together when we saw them yesterday. Mr. Harmon thinks that this insect is somehow the cause of this malady. At Mr. Elisha Harmon's we saw a head of wheat free from smut on one side, while every kernel on the other was nothing but smut."—*Genesee Farmer.*

We find an interesting statement respecting the weevil, in a communication from Kentucky to the American Agriculturist, from which we now quote it:

"*A new fact.*—It is generally believed that the eggs of weevil deposited in the grains of wheat are hatched out in the same season before winter; or, if not hatched out *then*, that they perish and do no injury to the grain. This may be the case with the white weevil, but it is not true of the black. In the fall of 1843, two years ago, I received from Virginia a shot bag filled with *Conner* wheat—an early ripening variety, much valued by some farmers in that State. It was a fair, sound, beautiful sample of grain. I had just sown before its reception a small quantity of the same variety, and determined to keep this to sow the next year, fearing some accident to the seeded crop. The shot bag of wheat was very carefully put away in a clothes press—so carefully that it did not again come to light till about ten days ago. On opening the bag a number of black weevils were seen, which had come out. Others were in the act of coming out of the grain; and, on cutting open grains which appeared sound, the insect was found in the grain. Do not the eggs of insects remain dormant, like seeds of plants, till the proper conjuncture of circumstances for their active existence takes place? This may not be for years, or may happen the same year.

"The black weevil also hatched out of grain here *of the present year's*

harvest, for one of my neighbors culled from his field a small sack of wheat he thought might be a valuable kind, cleaned it out, and suspended it by a rope in an upper room of a house. When he took it down to sow, a few weeks ago, he found great numbers of black weevil hatched out, since harvest, in his sack of selected wheat. The conclusion at which I arrived is, that no season favorable to the active life of these insects has occurred here in 1843 or 1844; but that this season, being favorable, not only those deposited this year, but those also remaining dormant in the grain, deposited in previous years, have been excited into active existence. Great injury has been done by these insects this year in this State, and much of the wheat cleaned out has been destroyed by black weevil; and, in cases where it was got out of the straw and left in the chaff, it has been injured by white weevil—a circumstance causing astonishment; as leaving it in the chaff has been thought a sure preventive of injury by them. The wheat left in the stacks till this time is also generally injured, and, in some stacks, utterly destroyed by the white weevil. Can any of your correspondents tell us how to avoid these injuries to the grain after it is made?

"JOHN LEWIS.

"Llangollen, Ky., *October* 18, 1845."

A new insect in wheat is described by a correspondent in the Cultivator for May, from Bucks county, Pa. He says: "It is a small green worm, about an inch in length; its head is brownish green, with two brown spots upon it. The worm ascends the stalk of wheat soon after it has put out in head, cuts off the head, and feeds upon the top of the standing part." He apprehends great injury to the wheat crop there, unless some remedy is discovered, and supposes it may be the army worm; but the editor of the Cultivator speaks of it as new to him.

Another insect is thus noticed in the Prairie Farmer, as found in Illinois: "We are informed that a very singular and destructive insect has made its appearance in parts of Will county, where it makes itself very disagreeably destructive. It is a small fly, a little more than one-eighth of an inch in size when grown. It has four wings, which, when folded upon the back, present the shape of a diamond. They were discovered at wheat harvest, when their presence was indicated by the heads of wheat turning white. The insect was found in myriads, covering the straw, particularly about the joints. Upon touching the wheat stalks they would fall, as if dead, to the ground. When the wheat was cut they took to the cornfields, if near, where they are now making themselves much at home within the husks or under the sheaths about the stalks. Corn which was not too far ripened when they found it, died immediately. They are now preying on the young wheat, which they eat off just beneath the surface of the earth, taking all clean as they go. They are in all stages of growth, and have been from the first; and the ground is perforated with holes made by them. Their scent is that of the bed-bug, and a field of them is anything but delightful. The ant-eater, which preys on the aphides, preys also on this insect."

While upon this subject, we may mention an essay on the wheat fly, by Dr. Asa Fitch, published originally in the New York Quarterly Journal of Agriculture and Science, as a pamphlet which contains much valuable information for farmers in the wheat-growing States. In a letter from Professor Johnston, the eminent agriculturist of England, addressed to Charles

Fox, of Gross Isle, Wayne county, Michigan, (and published in the Michigan Farmer,) by whom he was consulted on the cause and cure of smut and rust in wheat, the Professor says: "About the smut and rust, your notice is all right—steeping in a solution of salt that will float an egg, and then drying the wet seed with quick lime; fermented urine, blue vitriol, (*sulphate of copper*,) and arsenic, are also used as steeps for the same purpose of killing the fungus, with greater or less effect. The rust arises from the over-luxuriance of the growth of your wheat, which will diminish; but especially from the wetness of your soil, or the rains and mists to which, in the midst of so much water, your land may be subject. A good dose of lime, perhaps *plastering* your wheat, might help this disease; but it will lessen as your land is better drained, and rendered drier."

And in relation to rust in wheat, we add the following statement, which may deserve some notice:

"A correspondent of the Genesee Farmer states that he has recently examined many rusted stalks of wheat with a magnifying glass of a very high power, and finds the outer covering of the straw burst open, the edges raised up, and through the apertures thus made the particles of rust protrude. The appearance of the rust he states to be that of dried mucilaginous matter. The rust in this case examined must not be confounded with the red rust, which is entirely external, and can be washed off."

Further accounts of methods of preparing seed-wheat to prevent disease, &c., will be found in connexion with several articles on the culture of wheat, &c., in the appendix No. 2.

The statement in the appendix signed "A farmer in Tompkins county" taken from the Cultivator for January, 1846, is one deserving of attention. Another, in the same paper of July, 1845, contains an extract from Vancouver's Survey of Devonshire, England, in which the surveyor ascribes the rust and mildew to weakness and tenderness, in consequence of late sowing and bad situations. He says: "District No. 1.—The mildew or rust is but little known, except in small enclosures and low situations, where the crop is excluded from a free circulation of air; in the higher parts of the country where the fields are large, and the division mounds are covered only with dwarf hazel or willow and creeping brambles, the evil is by no means such as to require particular notice. District No. 4.—Late sown wheat is found to be particularly subject to rust or mildew, and is much complained of. No. 5.—Wheat sown late is always more or less injured by rust or mildew. No. 6.—When turnips fail, the land is sown with wheat, the early sown crops of which are the best sample, and by far the freer from rust or mildew. No. 7.—The late sown wheat is always very liable to rust or mildew."

Sir John Sinclair, in his Code of Agriculture, (a standard work,) after a full discussion of the subject, recommends, as prevention of rust: 1st, cultivating hardy kinds; 2d, early sowing; 3d, raising early varieties; 4th, thick sowing; 5th, changes of seed; 6th, consolidating the soil; 7th, using saline manures; 8th, improving the course of crops; 9th, extirpating all plants that are receptacles of rust; 10th, protecting wheat plants by other crops. In some parts of the country, however, it is said that early sowing will expose the crop to the ravages of the fly. At a late meeting of the Academy of Science in France, M. A. de Jussieu said that he had recently seen several ears of wheat which had been attacked by the ergot. It is well known that this disease is generally almost entirely confined to rye.

The following method of managing seed-wheat is given in a public journal, as derived from an experienced wheat grower. It may be interesting to some:

"Before entering upon his harvest, he selects a portion of his field for seed, and reserves that for his last cutting. As his harvests are large, this portion gets fully ripe before he is ready to cut it. After drawing and mowing away the rest of his crop, he secures this also; but, instead of placing it in a mow or stack, he puts it on a scaffolding over his barn floor. This is done to prevent the seed-wheat from being affected by the steam which rises from wheat, and which he thinks would injure it. When seeding time comes, he threshes out his seed, and sows it *without any preparation.* He has pursued this course a number of years, and has never had smut in his wheat to any extent since he adopted it."

Besides the varieties of wheat which have been already mentioned in the account of the crops above, we may here notice some others, which seem to possess qualities which entitle them to consideration. A kind called the Etrurian wheat, introduced by Commodore Stewart, possessing, as is said, all the advantages of the Mediterranean, and has, besides, a remarkably strong and vigorous stalk, has been cultivated with success by the Rev. Daniel Zollickoffer, of Maryland. Accounts of this variety may be found with that of others yet to be mentioned, in appendix No. 2. Two other kinds are thus noticed in the American Farmer. Mr. Smeltzer's letter will also be found in the appendix No. 2, just mentioned. Samples of some of these kinds of wheat, as well as the Etrurian, have been received, and will be distributed from the Patent Office to the members of Congress.

"The Baltimore American notices a specimen of white wheat, very remarkable for its extraordinary size, which was grown on the farm of Mr. Joseph Pearson, about three miles northwest of Baltimore, who has this year raised about three hundred bushels, the produce being estimated at forty-five bushels per acre. The stalks are about six feet high, very stout at the bottom, and the grain fully one-half larger than the ordinary red wheat. The strength of the stalks enables it to stand the wind and rain, and it is said to be entirely exempt from smut.

Several years ago, Mr. Pearson purchased and sowed a quantity of wheat procured from New York; among which several heads appeared towering several feet above the other grain. These were carefully collected, producing about a gill of grain; and, in a few years, Mr. Pearson has succeeded in raising from them the quantity above mentioned. He supposes it to be a species of Chinese wheat, the description of which it closely resembles." In a letter received at the Patent Office from Messrs. Pearson, relating to this wheat, it is said: "This present crop was sown after the middle of October, last year. It was soaked over night in brine strong enough to bear an egg, which will float any *cheat*, *garlic*, or other trash that might be in it and assist in sprouting; it is then drawn off, spread upon a floor a short time, and sown."

Again: "Mr. Henry R. Smeltzer, near Middletown, Frederick county, Maryland, has raised this year, from $4\frac{1}{4}$ acres, 212 bushels and 43 lbs. of wheat, which is over 50 bushels to the acre. It is called the 'Oregon.'" The Catoctin Enterprise says the land was carefully surveyed by George Bowlers, esq, and the wheat threshed by the machine of the Rev. Mr. Henry, who saw it measured. It was sown on the 5th October last, not quite $1\frac{1}{2}$ bushels to the acre; it is of a beautiful bright red color, and smooth

chaff. Mr. S. also raised the "China" wheat, which yielded, as near as could be ascertained, about 47 bushels to the acre; this is a most beautiful white wheat, ripens early, and is said never to have been injured by the Hessian fly, mildew, or smut. This and the "Oregon" is on sale by R. Sinclair & Co.

A letter to the editor of the "American Farmer," from R. E. C. Downes, esq., Church Hill, Dorchester county, Maryland, says: "I have just seen a bunch of perfect wheat, of the yellow-bearded variety, consisting of 76 stalks from one grain. The stalks are nearly all of the same height, good heads, and perfectly ripe. It was raised within a few miles of this place, and has been left here for exhibition, and to be forwarded to your city. I have never before heard of any thing like it, and it is quite a curiosity of the wheat crop—at least to me."

"*Washington wheat.*—This is a white-bearded wheat, with very large well filled heads, offered for sale at Coates's seed store, Market street, Philadelphia. It is part of the produce of a single head of 21 grains, which came from Italy with Greenough's statue of Washington, and sent from Washington city by Hon. O. H. Smith, of United States Senate, to his nephew, William Parry, of Burlington county, New Jersey, who has given it its present name."

Another kind of wheat, a small quantity of which has been received and will be distributed, is called the Aguirre wheat, from Spain, which promises to be a valuable acquisition. The account of it from the Albany Cultivator, and in the letter of Mr. Townsend, will be found in the appendix No. 2.

A variety of wheat called the Alabama or Hackleman wheat is mentioned also in the Ohio Cultivator, an account of which will also be found in the same appendix.

The American Farmer for August mentions a sample of wheat grown by Thomas Duckett, some of the heads of which yielded 100 grains. This was raised, he states, on a field from which two consecutive crops of corn had been gathered.

Some objection has been made to the Mediterranean wheat, and the price reduced. The American Farmer notices this fact, and furnishes a method of remedying the difficulty, as follows: "The price of this wheat is about five to seven cents less than other varieties; and the flour made from it, to a considerable extent, has been reduced, by the inspectors, in the standard. In a recent visit to Washington county, Maryland, we mentioned this fact to our friend, Mr. J. Funk, on Beaver creek, a gentleman noted for the excellence of his wheat crops, having raised thirty-three bushels per acre in succession off the same field, with no other manure than that obtained from the barn yard. He informed us that such had been the case in his vicinity, but that when his grain was sent to mill, he directed that notice should be given a day before grinding; accordingly, he repaired to the mill, spread out the wheat, and sprinkled it with water, and thus left it till the following day, when it was sufficiently dry to grind; and his flour was equal at least, if not superior, to that from wheat of any other variety."

A variety of interesting articles relating to the culture of wheat, &c., which have been gathered from periodicals and journals, both of our country and from abroad, will be found in appendix No. 2, among which we would mention, as particularly deserving of notice, the utility of deep ploughing, charcoal as a manure, the views of Mr. McVean relating to the

wheat districts of New York, and the remarks of the editor of the Ohio Cultivator as to the wheat crop for 1846, with experiments in wheat culture, &c., proper time of sowing, &c., McNaill's and Underhill's statements respecting the culture of wheat, &c.

A mode of putting in wheat, called *ribbing*, as practised in England, we find described in the Ohio Cultivator, by Mr. Noble, of Stark county, in that State, and which the editor recommends as "worthy of trial." We give the extract as it stands in one of the public journals:

"*Ribbing in wheat.*—Mr. Thomas Noble, of Stark county, near Massillon, whom we visited a few days since, practises a mode of putting in wheat that is called, in his native country, (England,) 'ribbing;' and, from his experience in this country, he is convinced that it is superior to the common mode of sowing, at least for his kind of soil, which is a fine hazel loam, or what was called 'oak plains' in that region, and is well adapted to this crop. After the land has been thoroughly ploughed and harrowed, till it is in what would commonly be called good order for sowing, Mr. Noble goes over it with small narrow one-horse ploughs, made for the purpose, and which leaves the land in open furrows four or five inches deep, and ten or eleven inches apart; the seed is then sown one bushel to the acre, and the ground harrowed once over, lengthwise of the furrows. This harrowing brings the seed into the furrows and covers it there, and leaves slight ridges between; so that the plants appear as if drilled in rows, and the ridges afford them protection in winter, and keep the ground in a mellower state in summer, besides affording a freer circulation of air, &c. We think the plan eminently worthy of trial, especially on such lands as are subject to 'winter killing.' It is an improvement on the plan of ploughing in wheat, practised by many. With a gang of ploughs, or a machine for making three or four furrows at once, which Mr. Noble intends to construct for this purpose, the amount of labor will be very much reduced."—*Ohio Cultivator.*

Harrowing wheat in the spring is also stated to be useful, and a correspondent of one of the papers says: "That having, one year, left his harrow in the wheat field all winter, he was obliged to drag it across his wheat when he removed it early in the spring, and that the track of the harrow was plainly perceptible through the season, in the greater thriftiness of that part of the grain. The next year he harrowed a few acres of his wheat as early in the spring as the ground would permit, and found the most beneficial effects. The harrowed wheat grew with remarkable rapidity, and turned out decidedly a heavier crop than any other part of the field, though all was sowed at the same time." The editor of the Michigan Farmer says: "For the extensive growing of wheat, no manure is equal to the large German clover, plastered and ploughed under; and every farmer who will give to his wheat fields every third year a crop of clover, will not 'sacrifice his ultimate interest.'" Another writer recommends the following top-dressing for wheat: "Salt; salt and lime; salt, lime, and ashes; soot; soot and ashes, make excellent top-dressings for wheat. If salt should be applied alone, two bushels to the acre is the proper quantity; if salt and lime, two bushels of salt and ten of lime should be sown to the acre; if soot alone, from ten to twenty bushels per acre; and if soot and ashes, ten bushels of each will form a most valuable mixture."

It is often desirable to calculate the amount of the wheat crop as it stands on the ground; and this is said to be done in England with very considera-

ble accuracy, in the manner thus described: "About the time the wheat is blooming, generally about the beginning of June, (winter wheat in England,) a person will go round with a gauge secreted in a hollow cane, which forms, when opened, a triangle, and represents a certain portion of an acre of ground. This is placed over various portions of the crop, in the best and in the worst parts of the field. The number of ears of wheat within the triangle is counted, and the probable quality of the grain is taken into calculation, according as the spring has been wet or dry. On the former supposition, the grain is likely to shrink; on the latter, to harden and come out plump. It may be observed, that if there has been a good general rain during the last ten days of April, and the first ten days of May, on the average no more wet is required in that climate (England) for wheat. An expert gauger will form a very accurate estimate of the probable produce of a given district by this method." The editor of the Maine Farmer states that, by actual counting, it has been ascertained that a bushel of wheat, weighing 62 pounds, contained in round numbers about 550,000 kernels; so that if we were *sure* that every grain sown would grow and come to maturity, taking 42,360 square feet for an acre, and dividing each foot into four compartments, and placing a grain of wheat in the centre of each, the whole acre would only require four-fifths of a bushel.

We add here a statement, which we find in one of the public journals, respecting the difference of weight in a bushel of wheat in some of the States, as it sometimes may be useful. The writer says:

"As I have seen some statements in the papers as to the weight of a bushel of wheat raised by some farmer in Pennsylvania, I would remark that the Pennsylvania bushel, and that generally used in Maryland, is larger than the Virginia standard bushel by nearly three half pints. The greatest weight I have seen, to which the Pennsylvania wheat reached, was 69½ pounds to the bushel. My friend and neighbor, Mr. William Pendleton, had a bushel of seed wheat, of his raising, by the Virginia standard measure, weighed accurately on the flour scales (patent balances) in the Honeywood mills, which weighed 68½ pounds strong draught."

"*Grain measures.*—By a law of Indiana, passed last winter, the weight of a bushel of grain is fixed as follows:

A bushel of merchantable wheat shall be taken and given, in all contracts, at sixty pounds.

A bushel of rye shall consist of fifty-six pounds.

A bushel of corn shall be taken at fifty six pounds.

A bushel of flax seed at fifty-six pounds.

A standard bushel of merchantable barley shall consist of forty eight pounds.

A standard bushel of oats shall consist of thirty-three pounds.

These weights of the respective grains now constitute in Indiana the legal standard bushel; and, under a contract to deliver so many bushels of grain, the delivery of these weights per bushel will constitute a legal tender."

Professor Lindley, of London, speaking of the maturity of grain, says: "It is a remarkable fact, that the further north *grain* can be made to grow, the shorter is the period of time in which it comes to maturity. It has also been observed, that when it is grown in the extreme north, when used as seed in the southern country, it gives its first produce more speedily, ripen-

ing in a much shorter time; although at the second sowing it loses its quality."

In the New York Farmer and Mechanic, the quality of wheat raised in different sections of the country, and the kind of manure which may be used to advantage in the production of this grain, are thus stated: "Wheat is known to be the most nutritious of all grains, because it contains a larger quantity of gluten. But I do not know that it is generally understood, except by scientific agriculturists, that this quantity of gluten may be varied both by climate and the character of manure; yet such is, nevertheless, a well-attested fact. 1st. Wheat of warm climates has more gluten, is harder, and less easy to grind. The difference between the two, in climates not very distant, may be safely calculated thus:

	Warm climate.	Cold climate.
Starch - - - - -	56.05	71.49
Gluten - - - - -	14.55	10.96
Sugar - - - - -	8.48	4.72
Gum - - - - -	4.90	2.32
Bran - - - - -	2.30	
Water - - - - -	12.30	10.00
	98.58	99.49

2d. The gluten of wheat may be increased by the character of the manure used, thus:

	Gluten.
Wheat, average crop - - - - -	19.00
Wheat raised on soil manured with ox blood - -	34.24
Wheat manured with human urine - - -	35.01
Wheat manured with human fæces - - -	33.94
Wheat manured with horse manure - - -	13 68
Wheat manured with cow manure - - -	11.96

From so much of the above facts as show how far climate varies the quantity of gluten, it results that there is a great advantage in Alabama wheat over the northern. Now what is this advantage, as applied to practical purposes? I will explain. Two pounds of Cincinnati flour was weighed out, and to it was added one quarter of a pound of yeast; two pounds of McAlroy's (Alabama) flour was weighed, and in like manner was added one quarter of a pound of yeast; both were accurately weighed in the same scales, and at the same time, and both made into loaves and baked in the same oven. The result was as follows: The Cincinnati flour yielded a loaf weighing 3 lbs.; gain $\frac{3}{4}$, or 33 per cent. McAlroy's flour yielded a loaf weighing $3\frac{1}{2}$ lbs.; gain 4.14, or 55 per cent. *The gain in Alabama flour* 22 per cent.! or, every five barrels of Alabama flour is equal to six of northern flour. But, says one, the northern flour must be the better; because, look at the loaf; it is whiter and lighter. True; but let it be remembered that this difference with respect to whiteness, is the difference in the preparation and grinding; and that of lightness, is chiefly in the absence of gluten. The quantity of the flour may be affected by the mode of preparation and grinding; but the quantity of the several principles composing it

cannot. The same quantity of starch, gluten, &c., must be retained, whether the wheat be ground in a good or bad mill."—*Mon.*

These facts are interesting, and deserve attention. We have already given some account of the Alabama or Hackleman wheat, as it is termed in anOhio paper.—(See appendix No. 2.)

BARLEY.

The crop of barley in the State of New York, where more than half the crop of the whole country is grown, was in general a very good one—better than in the previous year. Taking the census of that State for the year 1844 as our basis, we have found it necessary to increase the estimate in the table. The accounts we have received respecting it, except in some few sections, are most limited. In the northeastern section of the State it was about "10 per cent. more." On the eastern side of the Hudson, below Albany, it is considered as having been larger than in the previous year, and in some counties "15 or 20 per cent." West of the Hudson, and below the Mohawk, while it fell off in Schoharie county, it was a fair average in Otsego county. On the Mohawk, also, and above, it was also "an average crop." Still further to the west and to the north, it varied from "10 to 15 per cent. increase." In the more western central counties, and in the western part of the State, the increase in some sections was yet larger; "20, 25, 30," and even in some cases it is thought to have been as high as "50 per cent." As the barley crop in this State is shown, by the late State census, to have been previously under-estimated, the amount of the crop will be comparatively larger than it would otherwise have been. We suppose it may have reached an average of about 15 per cent. more than in 1844, according to the State census.

In some of the New England States the crop is said to be "coming more into repute every year. Its excellent qualities for feeding give it great commendation; and its value as a crop to stock after is surpassed only by the wheat crop." Of the crop in Maine and New Hampshire we can gather but little, except that upon the whole it was a better crop—probably 5 per cent. more. In Vermont it was equal or something better than the crop of the previous year, and the increase may be fixed at the average crop of about 5 per cent. In Massachusetts, in the eastern sections of the State, though but little was raised, there was probably an increase of 10 to 15 per cent. The same was likewise the case in the central part of the State. In the western, however, it is thought to have fallen off, from the drought which prevailed in June and July. On the whole, there was an average crop of 8 per cent. The crop in both Rhode Island and Connecticut is small, and may have been about the same as in the adjoining States. So little attention, comparatively, is paid to this crop in nearly all the remaining States, that it is difficult to arrive at any very satisfactory estimate. It was, as is supposed, about an average crop in New Jersey, and considerable less in Pennsylvania, as it suffered severely by the drought. In the southeastern, eastern, and central sections, it is thought to have fallen off from "25 to 30 per cent.;" and, taking the whole State through, we believe it must have been less than the crop of 1844 by "about 10 per cent." In the States south of Pennsylvania, for the most part the decrease must have been equally large, if not larger, from the same cause. They, however, produce so little, that the general result can be but partially affected by this

diminution. In an agricultural paper in Virginia, however, it is thus recommended:

"*Barley a profitable crop.*—There is constant demand for this article in the west, where the consumption of malt liquors is immense. It is a very sure crop, and liable to none of the diseases peculiar to wheat; yields about double the quantity, and commands a higher price. Those who have cultivated it in this vicinity, we understand, have succeeded well. We make the following extract from an article on the subject in the last number of the Winchester Virginia Farmer: 'The cultivation of barley has been of late years much neglected in Virginia. We find, however, here and there some few of our friends disposed to give it some degree of attention, as a grain worthy their notice; and, among those who have been the most successful in producing a fine crop, we would note the case of our friend, Mr. John Bruce, of this place. From a four-acre lot we are told this gentleman raised, during the present season, two hundred and ten bushels of clean barley, averaging, as will be seen, fifty-two and a half bushels per acre, making the round sum of one hundred and fifty seven dollars and ten cents, and, after deducting interest of land, cost of labor, seed, &c., yielding him the handsome profit of one hundred and twenty dollars. Now, if there is any other crop that comes up to this, or any farmer who has derived a greater profit in cultivating the same number of acres in small grain this season, we should like to hear from him. When we take into consideration the fruitful yield of barley, and its freeness from fly or other infections so common to wheat, we are strongly of opinion that it bids fair to become a great staple in portions of the valley. The Winchester brewery will give seventy-five cents per bushel. It is required to weigh forty six pounds to the bushel.'"

In Tennessee and Kentucky—which, however, raise only a small crop—there was about an average yield; perhaps "a slight advance" on the crop of the previous year. In Ohio, on the eastern central border, there was a considerable falling off; probably "30 per cent. less." In the more northern counties it was "about equal" to the crop of 1844. In the northwestern part of the State a slight increase; perhaps "10 per cent. more." In the southwestern, from the central, "25 per cent. more." In the Miami valley, however, the individual crops probably fell as much as "25 per cent." On account of the increased demand, there is said to have been much more cultivated; and thus the whole crop in that section is thought to have reached as high as "75 per cent. more" than in the previous year. More than half of the whole crop of Ohio, as it appears from the census, is raised in some half dozen counties of the State. Taking the whole State, we are inclined to believe that there was an increased crop of 10 to 15 per cent. more than in the year before. In Indiana, Illinois, and the other western States, we believe also there was a small increase; and in Michigan, Iowa, and Wisconsin, which rank higher in their attention to this crop, a very considerable advance. The crop of Iowa is estimated, by one whose opportunities of judgment must be allowed to be good, at 30,000 bushels. We suspect, however, that this is rather too large an estimate, though our own of the preceding year was much too small evidently, as the crop of Platt county alone is said to be 5,000 bushels. We think that Wisconsin was probably about 20 per cent. more, and Michigan in the same proportion. The whole barley crop, therefore, would amount to about 5,160,000 bushels.

Some mention was made in the report for 1844 of a kind of barley called the Emur barley. We notice a few observations respecting it during the past year, in the Cultivator for October and November. The first is from a correspondent who is spoken of as W. B., of Laurens district, S. C., who was very anxious to obtain some of this kind of barley. "He formerly had it, but lost the seed by suspending the business of farming for a few years, and removing to another district. He says: 'I am fully satisfied, from the trials I have made, that it will produce from 30 to 50 bushels per acre, and that our soil and climate will suit it. It will bear stable manure; whereas, the increased application of that article to wheat invariably tends to throw it into straw, and causes it to lodge.' He offered five dollars for one bushel of it, delivered at any seaport and shipped to Charleston." The editor of the Cultivator remarks: "We cannot see, from this description, how this barley differs from the naked or bald barley, which has been more or less known in the country for several years." In the November number of the same publication, the editor observes that a sample of the bald or naked barley has been sent him by John D. Spinner, of Herkimer. He states that it is a handsome grain, and weighs above sixty pounds to the bushel, and is said to be very productive. Mr. Henry Brewer, of Enfield, New York, also mentions in a letter alluded to in the same work, that he sowed half a bushel of "skinless" barley in the spring on seventy-two rods of ground, and the produce was sixteen bushels, weighing fifty-eight pounds per bushel. It was much injured by the drought and grasshoppers. He thinks it, however, a valuable kind of grain, and says that it makes good flour, which is preferred to buckwheat for cakes. In the Mark Lane Express for July 21, 1845, this grain is thus characterized:

"This valuable grain is worthy the serious consideration of the agriculturist, as returning a greater profit than the barley in general cultivation; and, if grown side by side, will yield more bushels, more flour for human food, and 25 per cent. more beer, and also will feed more stock; because—

"1. It contains more flour than any other grain, rice only excepted.

"2. It weighs more than sixty pounds per bushel.

"3. The flour is whiter and sweeter than common barley flour.

"4. The flour absorbs more water than other flour; consequently, it produces more weight of bread.

"5. Bread made from any barley flour is better made into thick cakes; and if from a fourth to an eighth of an ounce of carbonate of soda is dissolved in the yeast, it improves all bread, and takes the bitter taste away.

"6. By plain boiling, it is good food for children.

"7. The malt made from it increases in measure more than from common barley.

"8. The malt will make in seven days less than common barley.

"9. It can be made one month earlier and one month later than from common barley.

"10. It weighs considerably more than the malt from common barley.

"11. The quantity of beer made from this malt is 25 per cent. more than from common malt, and of superior flavor.

"12. Three bushels will seed the land as well as four of other barley.

"13. It should be sown in March or April.

"14. It ripens in eighty or ninety days only.

"15. If sown without grass, it can be harvested in two or three days.

"16. If sown early, it may be harvested in time for a following good crop of turnips.

"17. It only requires the same cultivation as other barley.

"18. The straw is much superior for fodder.

"19. It very seldom lodges, and is not subject to disease.

"20. Each acre of this barley produces about one-third more food.

"N. B.—The produce of this barley, both in quantity and weight, surpasses all others; and, as regards its malting qualities, and extract of saccharine, is even *superior* to the best Chevalier barley in quality as well as quantity." —*Northampton Herald.*

In the Mark Lane Express for September 8, 1845, a new species of barley is mentioned, which, upon a light soil, produced from 8 to 10 quarters (equal to 64 to 80 bushels) per acre. It is said to be fine in quality, and good for malting purposes.

Efforts have been made to procure some Himlaya barley, mentioned in a previous report, but as yet they have been unsuccessful. There appears to be some diversity of opinion on the continent respecting the value of this grain, as we learn from some of the German journals received at the Patent Office.

OATS.

Oats being a favorite crop, and raised more or less in every State, seem to have been extensively cultivated; but the drought affected the crop more than usual in some parts of the country. In New England, on the whole, it appears to have succeeded. The Maine Farmer, in July, says that "oats are rather light, but will undoubtedly yield a remunerating harvest." In the central and northern section, also, we are informed that there was an advance of "10 per cent." over the crop of 1844. In the lower section of New Hampshire, on the southeast, it is thought that the increase was at least "10 per cent.;" in the central lower section there appears to have been a decrease; and in the central western, a good judge, after reviewing the weather, both before and during the harvest, states the crop to have been "an unusually large one, as more than common was sown." On the whole, regard being had to this product as set down in the census, we may fairly estimate the increase at from 10 to 15 per cent. for the State. In Vermont the crop was a good one; and, from all that we can learn respecting it, there was an average increase of about 10 per cent. In Massachusetts, in nearly every section of the State, there was a gain, ranging from 10 to 15 per cent. In the eastern central part, the crop was unusually early, and did well. In the western section it is thought to have fallen off perhaps "one-third," which is ascribed to the drought in June and July. A writer from that section, in a letter to the Boston Cultivator, says: "Oats seem to be going rather out of fashion, as well they may; for every year proves them to be an exhausting crop, and a miserable one to stock with." In the western part of the State, according to the census, the oat crop is usually larger than any other; and, after comparing the accounts in the various counties with the returns of the census, we believe that the crop must have had about the average increase of a good crop; "about 10 per cent." over that of 1844. In Rhode Island and Connecticut, also, more was sown and raised, and the gain was probably about the same as in Massachusetts. The crop fell off in New York. The accounts from all sections nearly unite in the testi-

timony to this effect. The State census, which we have taken as our basis, shows that our estimate the last year was too great. The drought very seriously affected the progress of the crops in all parts of the State; but in some sections the injury was greater than in others. In the southeastern section, and along on the Hudson river, either side, where large quantities are raised, it probably fell off from "20 to 25 per cent.;" and, in some cases, the decrease has been estimated as high as "50 per cent." As we proceed north, however, the damage sustained does not seem to have been as great; and, indeed, in the northeastern and northern portions of the State it is thought to have been better by from "5 to 10 per cent." Along the Mohawk, it was "about an average crop;" but south of this again it fell off considerably. As we proceed west, in the central portion it is variously estimated to have been "10, 15, and 20 per cent.;" and still further west, (with the exception of the southwestern corner, where, on account of more having been sown, there was a slight advance,) the crop declined, as is thought, about one-fourth. The decrease, therefore, in the whole State, can hardly be estimated at less than about 10 per cent. on the crop of the State census of 1844. The oat crop of New Jersey was, also, less than that of the preceding year. In the central counties, across the State, it is estimated at "one-third less" than an average crop. In the northwestern section the decrease is thought to have been not quite so great, but perhaps "about 10 per cent." On the whole, it may have fallen off about 15 or 20 per cent. from the crop of 1844, which season, it will be borne in mind, was favorable to this product.

The prospect of the crop in Pennsylvania, in the spring, seems to have been promising. Thus, in May, the Germantown Telegraph says: "Spring, thus far, for oats, which are already several inches high, could not have been finer. A considerable extent of ground is occupied this year with this grain, which, judging from present appearance, will turn out well."

In the months of June and July, however, the drought very seriously impaired this prospect, so flattering; and it is stated in the public journals that "oats promise to be only tolerable." Since the harvest, also, we have similar reports from various sections of the State. In the rich agricultural county of Lancaster it is thought that this crop was "40 per cent. less;" and it is said: "Oats, in consequence of the dry weather in April and May, were short in the straw and light in the grain; the deficiency is not short of 40 per cent., as compared with the preceding year, and of an inferior quality at that." In Chester county the crop suffered much from the drought in June and the early part of July, and is probably "50 per cent. less." In the eastern central section, near the Delaware and Lehigh rivers, the same complaint is heard of drought, and the crop is thought to have decreased from "15 to 20 per cent." In the northern central counties, lying on the Susquehannah and its branches, it is judged to have been about the same as last year. Lower down, however, on the same river, and west, there was a falling off of not less than "one-fourth of the crop." In the northeastern and northwestern parts of the State, also, there was a falling off of from "5 to 15 per cent." The crop for the whole State, it is believed, suffered a decrease of 15 to 20 per cent. The same may probably be said of Delaware.

The early accounts of the oat crop of Maryland are discouraging. Thus the Centreville Gazette speaks, respecting that of the Eastern shore: "The

oats are fast ripening, and will soon be ready for the cradle, though there was but a light sowing, and the prospect is not very flattering."

Subsequently, the American Farmer says: "The oat crop will be short, though not so light as had been anticipated a month ago. Some late rains helped the oats which had not been too far advanced to be affected by it, (the drought.) On the Eastern shore of this State, it is said the crop will not probably exceed half the usual one." By some persons the crop of the northeastern section of the State is thought to be "50 per cent. less." There can hardly have been a less deficiency, throughout the whole State, than about 25 per cent.

The Southern Planter, speaking of the oat crop in Virginia, in June, says: "Notwithstanding the oats have put out prettily since the late rains, they were so retarded by the drought that the crop, we should think, must of necessity be a short one." Again, In July, an account from Richmond states: "There has been a sad falling off in oats, many farmers deeming their crops scarcely worth gathering, they being 35 cents per bushel." Since the harvest, also, a correspondent of the Southern Planter writes from Lynchburg; and, speaking of the crop in the valley, says that there "is not one-quarter of a crop of oats." Other accounts likewise concur in representing the oat crop of Virginia as having been a light one. In the counties lying east of the Blue Ridge, and stretching up from Bedford to Madison, the report is that this crop was "almost totally destroyed by the drought." In the section directly east of this last, it was also "almost an entire failure—from 50 to 75 per cent short." In the southern central part of the State, bordering on North Carolina, it is also thought to have been "50 per cent. less." In the northwestern corner of the State, and also in the counties lying along the Kanawha river, the decrease is estimated to have been not less than "25 per cent." Such being the views which every where meet us respecting the oat crop of Virginia, we believe we shall not very greatly err by fixing the decrease as high as 40 per cent.

In North Carolina the drought likewise seriously affected this crop, and in all sections it fell off—some say "50, others 75 or 80 per cent." We judge it to have been about 50 per cent., or not more than half the usual crop. The same was the case in most parts of South Carolina and Georgia, though in the latter State, in the northwest corner, there is supposed to have been a much better crop; and the whole deficiency, therefore, may not have been more than about 30 per cent. compared with the crop of 1844. The like diversity respecting the oat crop is found in our accounts from Alabama. In the southeastern part of the State, we are informed by a good judge that the crop was about equal to that of the previous year. In the northeastern section it is estimated at about 15 per cent. more. In the central portion, on the branches of the Alabama, the drought is much complained of, and it is supposed that there is not more than two-thirds of a crop. On the whole, it is judged that the deficiency may have been about 15 to 20 per cent.

In Mississippi and Arkansas, there appears to have been a small increase; perhaps 10 per cent. above the crop of 1844.

In Tennessee the oat crop is said, on the whole, to have been better than in 1844. In the northeastern section, from the central, it is thought to have been less than that of the previous year by "about 20 per cent.;" while at the western part of the State there was, it is said, an equal advance. It may be fixed at about 10 per cent. for the whole State. A similar diversity exists in Kentucky; though, taking the whole State through,

the crop is an increased one. In the northeastern section of the State it was probably an "average crop." More towards the centre, the oat crop was probably "less by 10 per cent." In the southeast, "10 per cent. better." West of the centre, in the northern part of the State, it was "20 per cent. better;" while in the south, bordering on Tennessee, it is estimated to have been "less by 20 per cent." than the year previous. The whole crop was probably about 10 per cent better.

With few exceptions, the accounts relating to the oat crop in Ohio are favorable. In the eastern central section, bordering on Pennsylvania and the Ohio river, there is said to have been "not more than half a crop." In the southeastern part of the State, on the Ohio river, also, there was "not more than two-thirds of a crop." In the central counties, lying on the Muskingum and Scioto rivers, they are stated to have been "good," "a full crop," "25 per cent. more," &c.; "large, but not of the best quality." Still further south, "about 10 per cent. more." East of this last, "about 25 per cent. more." In the southwestern corner "the oats were much injured in the early part of the season from the drought, yet the frequent rains during the whole month of June caused a decided improvement to take place, and tolerably good harvests were anticipated." Later, the crop is considered to have been "an average one," while further east and north it is pronounced to have been "first rate;" "25 per cent. better." In the northwestern corner of the State, bordering on Michigan and Indiana, it is thought to have been "20 per cent. more;" further east of this, along the lake, it was "about 25 per cent. better;" while north and northeast of the central section it was also "25 per cent. more, as a much larger quantity was sown." We have estimated the whole crop of Ohio at an increase of 20 per cent. over the crop of 1844.

In Indiana, Illinois, Missouri, and Michigan, which raise large quantities of oats, the crop, in its early prospects, was also promising; and it was probably at least 20 per cent. more than in the previous year. In some sections of these States, the increase is estimated as high as "33 or 50 per cent."

The prospect of the oat crop in Wisconsin is thus stated, under date of Racine, July 15: "Oats bid fair to be an excellent crop, the slight rains and warm weather having enabled them to recover from the blighting effects of cold and dry weather of May and the beginning of June."

The crop of Iowa was also better than in the preceding year. For both Iowa and Wisconsin, we have estimated the advance at about 20 per cent. The crop is a favorite one, and the number of emigrants into these Territories is large; and, if any thing, our estimate may probably be too low. The whole oat crop for 1845, therefore, we fix at 163,208,000 bushels.

The following crop of oats we find stated in one of the papers, and it must be allowed to have been a heavy yield:

"*Large yield of oats.*—It is stated in the Racine Advocate, that Edward S. Blake, of Racine county, raised on one acre and one-sixth of land, this season, one hundred bushels of oats."

In the New York Farmer, of October 16, 1845, we find an account of a species of wild oats, which appear to be considered as valuable for fodder. We give it as we find it in the above named journal:

"*Wild oats.*—I have received from Captain Post, of Deep river, (Conn.,) a package of the grain of wild oats, and also a bundle of the heads of that grain. Captain Post states that he has about 10 acres of this aquatic grain;

and that from his youth up he has noticed that it was visited by the wild duck, blackbirds, and rice-birds, but did not know the cause until his attention was called to it by a paragraph of mine in relation to wild rice, which he saw a few weeks ago in your paper. He remarks that his neighbors were as much in the dark as himself. Since he read the paragraph referred to, he has made a full examination, and finds that the straw of this aquatic grain will yield about four tons per acre, and is as useful for cattle fodder as are corn-blades. A short time ago I received from Captain Post some of the blossoms of these oats, and several plants, with the roots attached, which I have heretofore noticed. The straw is near 10 times the size of that of wild rice, a specimen of which I have lately had from Rice lake, while the grain is only about half the size. I am of opinion that this grain will become a valuable aid to the farmer, and therefore it is that I call public attention to it. I shall exhibit some of this grain at the office of the Farmer and Mechanic. Yours, &c.,

E. MERRIAM.

In the Mark Lane Express, for September 15, page 15, we have the following account of remarkable oats:

"At a late meeting of the East Derbyshire Farmer's Club, Mr. Holbrook, the secretary, exhibited some specimens of oats, the stems of which were six feet six inches in height, and the diameter five-eighths of an inch. One plant produced 130 corns of oats, and another more than 300. The oats were dibbled in, the rows being fifteen inches apart, and the plants six inches asunder. The ground which produced these extraordinary specimens had been parched and burned."

The London Gardener's Chronicle contains the following:

"*On the choice of a variety of oat for cultivation.*—Strongly suspecting that the real value of different varieties of oat was unknown, and that weight by bushel was even less applicable to this grain than to wheat, I procured samples of nine sorts, carefully selected by Messrs. Lawson, of Edinburgh. I have not had them compared chemically; I leave that to those great and wealthy bodies associated for the ostensible purpose of conferring benefits on the farmer. I have followed a simple mechanical process, which any one may follow. The weight of each sort per bushel having been ascertained, the following table was constructed according to the results:

	Weight per bushel of
Siberian oat	45 pounds
Sandy	$52\frac{1}{4}$
Kildrummie	42
Early Angus	42
Hopetoun	41
Potato	$41\frac{1}{2}$
Early Dyock	$40\frac{1}{2}$
Late Angus	$40\frac{1}{3}$
Black Tartarian	39

The useful part of the oat being the kernel, and it being probable that the proportion of the weight of the husk to that of the kernel might vary so much as to render the weight per bushel a deception, 100 parts by weight of each sort were taken, and the husk and kernel carefully separated. The following table shows the result:

In 100 *parts by weight*—

	Husk.	Kernel.
Sandy oat - - - -	21	79
Early Angus - - - -	21	79
Late ditto - - - -	21½	78½
Potato - - - - -	22	78
Early Dyock - - - -	25	75
Black Tartarian - - - -	25	75
Hopetoun - - - -	26	74
Kildrummie - - - -	28	72
Siberian - - - -	31	69

It is curious that the oat at the head of the first table should be at the bottom of the second. There may be as great difference among oats as among wheats in regard to their nutritive qualities; and until this shall have been ascertained by the chemist, we shall not know the real comparative values. In the mean time, there need be no hesitation in preferring the sandy oat over all others, as it is very early and very productive in grain and straw."

RYE.

Nearly the whole rye crop is raised in a half-dozen States. Of these, the State of Pennsylvania ranks foremost, and New York next; then New Jersey, Kentucky, &c. In Pennsylvania, according to the census of 1840, a dozen counties in the eastern district raised one-half of the whole crop in the State. The accounts received respecting the rye harvest in these heavy counties, is, in general, favorable. In Lancaster and vicinity the rye is said to have "suffered somewhat from the late frosts in the spring, as it had done the preceding year." The amount, however, is supposed to have been as large as (perhaps somewhat larger than) in the previous year, and of a better quality. Similar are the reports from Chester, Bucks, and Lehigh counties, and vicinities. In Adams and York there is thought to have been a large increase—even as high as "50 per cent." The winter was favorable, as well as the dry weather in March and April, and later during the filling season, so that there was no mildew. In the central section, east and northeast, there was also an increased crop of rye. In the northwestern part of the State, also, this crop is described as having been very good; "equal to ten per cent." advance. On the whole, therefore, we think the rye crop in this State was probably fifteen per cent. better than in 1844. In New York, also, nearly five-sixths of the whole crop is raised in the part of the State which lies east of the centre, and of this more than one half is not a great distance from either side of the Hudson and Lake Champlain. In all these sections the report is favorable, varying, upon an average increase, "10, 15, 20, 30, and even as high as 40 per cent." In the other parts of the State, there seems to have been more sown, and in only one case do we observe any mention of failure or diminution. Taking the State census returns of this crop, which reduces our estimate of 1844, we have added about 20 per cent., supposing this to be a fair rate, in view of all the information we have been able to gather respecting the rye crop for the whole State.

In New England, so far as we have been able to ascertain, there has been a slight increase. As wheat has become more profitable and less subject to

destruction from insects, and rye is less used for distilling than formerly, it has very considerably fallen off for a few years past. In Maine, New Hampshire, and Vermont, the crop has probably increased about 5 per cent.; while in Massachusetts, in the sections where more than half the crop was raised, according to the census of 1840, it has fallen off, as estimated, from "5 to 25 per cent." In the western part of the State, the rye crop is said to have been "injured by a late frost in May, about the time it began to head, and the consequence was that it did not fill well; the heads grew full length, and a good share of them did not have half the number of kernels they should have had, and probably the heads most forward received the injury. We are inclined to think, therefore, that, taking the whole State through, there was some falling off—perhaps 5 to 10 per cent. A similar estimate appears to be demanded as to the remaining States of New England.

Of the rye crop in New Jersey—which State raises a comparatively large amount of this product—it is stated that in the central counties it was "a fair crop," and in the western ones it was "15 per cent. better." These two sections of the State, as appears by the census of 1840, raised more than one-half of the whole rye crop; and in view of the crops in the adjoining States, combined with such other information as we could obtain, we have fixed the advance of this crop in New Jersey at about 15 per cent.

But a small crop is raised in Delaware, yet there was probably a slight increase.

In Maryland and Virginia, also, there seems to have been an advance. In the northwestern part of the latter State there is thought to have been "25 per cent. more;" but this is too high for the whole. We suppose that if we take into view the influence of the season, &c., already adverted to in the wheat crop, it could not exceed 10 per cent. in either of these States. In the southern States, generally, there is comparatively little rye, and it is quite difficult to obtain any satisfactory information respecting this crop.

In North Carolina the crop fell off from "10 to 15 per cent." on account of the drought in the sections where at least one-half the whole crop returned by the census of 1840 was raised. In many of the other portions of the State, also, the drought, as we learn, was severe in its operation on the crop. It is therefore believed that there has been a diminution of this crop of about 15 per cent.

In South Carolina, in the counties which, according to the census, gave about one-half of the crop, the decrease of the rye crop is variously estimated from "10 to 30 per cent." We have placed it for the whole State at from 15 to 20 per cent. less. It will be remembered that the early drought in this State was most severe in its effects.

The same seems to have been the case in Georgia.

In Alabama, Mississippi, and Arkansas, we believe there may have been slight advance.

In Tennessee and Kentucky, an increased crop. In the latter State it is variously estimated at "an average;" "10 per cent.;" "20 per cent. more." These sections, thus given, according to the census returns, include the part of the State where more than one-half of the whole crop for the State is raised. In the other sections, so far as we can judge from the information respecting the influences operating on the progress of the crop, there was a similar diversity of opinion. On the whole, the increase may be estimated at about 10 per cent.

Considerable diversity of opinion also exists respecting the rye crop of Ohio. In the central, eastern, and north of central sections, there seems to have been a falling off, varying from "25 to 50 per cent." This quarter of the State, according to the census, raises about one-quarter of the whole crop. In the southwestern and northwestern sections, which include about another quarter, there seems to have been a gain of "25 per cent. and upwards." An extensive distiller in one of the southwestern counties estimated the increase in that vicinity as high as 100 per cent. The causes of failure assigned are, that a less quantity of rye was sown, and the drought affected its growth. On examining the census in relation to the remaining contiguous sections to those above mentioned, we find the more northern and central counties gave the heavier crops; and in these, from such information as can be procured, we suppose the crop to have been somewhat deficient. We apprehend, therefore, that the crop in the whole State must have been less than in 1844 by about 5 per cent.

Similar to the above is the diversity of opinion in regard to the rye crop in Indiana. Some allowance must be made for the greater quantity of land cultivated, as well as the increasing population. Still, however, it is a small crop; and while in some sections the advance was "25 per cent.," in others it fell off "20 per cent. or more." On the whole, the increase was probably not over 5 per cent.

The same was the case, it is believed, in Illinois and Missouri; though the increase in some sections of the former State is estimated as high as 10 per cent.

In Michigan, the gain on the previous crop is by some persons estimated at "25 per cent." We are inclined to think, however, that for the whole State it did not exceed 10 per cent.

In Iowa and Wisconsin there was some advance in this crop.

The whole rye crop for the United States may, therefore, be estimated at 27,175,000 bushels.

A fine sample of rye is mentioned in an agricultural paper, (probably the American Farmer,) and is described in the extract following: "*Rye, tall and short.*—Mr. Editor: All our farmers ought to know that the kind soil of Maryland is still capable of being easily improved, so as to yield abundantly the necessaries of human life and pleasure. The large sample of rye now sent to you was sown about the 1st of September last, (say a half bushel to the acre,) to test its capacity for branching in rich ground, which appears to be very great, as there are thousands of similar bunches in the field whence that bunch was taken; and each bunch is the product of a single seed, yielding thousands. The next smaller sample was sown thick, about the 10th of October last, and was mowed off close to the ground on the 23d of last April, when it was all out in head, and three to four feet high, yielding a large crop of good hay. It then sprouted from the roots again; and that is the second growth, which has so far matured in about 60 days. It should have been sowed on the 1st of September, and the hay crop taken off by the middle of April; then the second would be perfect by the 1st of July. The smallest sample was derived from a handful of rye sown as thick as the grains could lie side by side, in the same field; and at the same time the second sample was sown. The result was, that they were too thick to thrive; hence they yielded nothing worth saving. The products of our soil are improved as much in quality as in quantity, by good ground and good cultivation. Agriculture is the most important busi-

ness in the world; and yet no business appears to be less understood or more neglected.—*Thomas*.' The above, from an old and experienced farmer near Ellicott's Mills, was accompanied by the three specimens of rye alluded to; and while the first is truly '*tall rye*,' (nearly 7 feet,) and well filled, the smallest ($2\frac{1}{2}$ feet) looks more like *chess*, or cheat, than any thing we have seen, for many years, not to be that pest of the wheat field. The second specimen is about 5 feet."

The value of rye as a means of fodder for sheep, is stated in a letter contained in the Ohio Cultivator, as follows: "*Sowing rye for wintering sheep.* The following suggestion, though not new, may prove of value to many persons at the present time; and we thank the writer for calling it to mind. —*Editor.*

"HAYESVILLE, *Richland co.*, *Ohio*, *June* 27, 1845.

"MR. BATEHAM: From the present prospects in this part of the State, hay will be very scarce and dear next winter, and something, as a substitute, seems to be wanting among our farmers. The following plan for wintering sheep was suggested to me by an old practical farmer, and I think will commend itself to the reason of every one. He says he has tried it, and he has found that his sheep do better than by any other way. When ploughing his corn for the last time, when it begins to tassel out, he sows the ground with about a half bushel of rye to the acre, which grows up about knee high by the time winter begins. Sheep will feed upon this rye all winter, and want no other care, except a good shed to run under in stormy weather. In the spring, if farmers prefer a crop of corn or oats upon the ground, they can have it. If they think the crop of rye will be profitable, all they have to do will be to let it grow. Yours, truly,

"J. H. COX."

In the Landwirthschaftliche Dorfzeitung, or Village Gazette, of July 26, 1845, published at Leipsic, we find mention of a species of rye called the gigantic Siberian rye, a translated description of which we subjoin: "The gigantic stalked rye, known also by the name of the Siberian rye, must be the most excellent of all the kinds of rye hitherto cultivated, on account of its wonderful and gigantic product of grain and stalk, as well as the weight and goodness of its kernels. Six metzen, Prussian measure, (about 18 quarts English,) of this rye, are enough for sowing a morgen, (a little over five-eighths of an acre,) from which, on a well-fitted and prepared soil, in favorable weather, we may count on a harvest of 24 bushels. The single stalks of this rye reach from six to seven feet in height, and bear thirty to forty ears, which are from five to six inches long. [The Austrian and Prussian inch and foot are both somewhat longer than the English.] The grains themselves are much larger than the usual rye; a scheffel of it (a little over a bushel and a half English) weighs from 90 to 92 pounds; (a pound is larger than the English pound;) and in a drachm is contained only about 80 kernels—a proof of its goodness and weight. This rye, also, on account of its thin hull, gives an excellent flour. It must be sown at the end of August, or the beginning of September, that it may have time to acquire sufficient strength before winter. Pasturing it in the autumn with sheep has hitherto had no injurious effect, either on the crop of grain or straw."

The account is in a letter signed Von Plotho, of Magdeburg. We have been unable to find any description of, or allusion to, this description of rye

in Lawson's Agricultural Manual, Loudon's Encyclopedia, or Johnson's Cyclopedia; from which we infer that it is probably unknown in England or this country, and may deserve further inquiry, and perhaps importation and trial.

The Siberian oats are by some, in England, preferred to the Poland oats.

BUCKWHEAT.

The buckwheat crop of the New England States seems to have been better than in some years. It is, however, but little noticed in the agricultural papers; and hence it is not easy to form any very accurate estimate of its amount of production. We notice in particular only a few States, respecting which we have been able to ascertain with more precision. In New Hampshire—in the western part of the State—we are told that, "having had the benefit of rains, it has yielded a very good crop." In the southeastern section, though but little is grown, it is thought to have been "5 per cent. more," and "an average crop" in other parts of the State. The same was the case in Vermont. In Massachusetts—in the northeastern section of the State—it is judged to have fallen off "10 per cent." There is, however, very little cultivated. There was more in the central part of the State; and in the western it is variously estimated from "20 to 25 per cent. better." Of the latter section, it is stated: "The buckwheat crop is peculiar to itself; its growth is quick, and it commences blossoming early in its growth; and upon the same stalk you may see the blossom and the grain fully ripe. A fall crop and cool weather are necessary in maturing. The present season was favorable." The crop for the whole State was probably about 10 or 15 per cent. more than in 1844.

New York stands among the foremost of the States wherein this product is cultivated, and the crop appears to have been "somewhat better" in the northern; "not so good by 20 to 30 per cent." in the river counties generally; "about as good as usual" along the Mohawk; "poorer" to the southward of this section; and further west, in the central portions, and tow[ards] Pennsylvania, to have fallen off "15 to 25 and 30 per cent." In the southwestern corner of the State it is said to have been "a trifle better." As the decrease took place in some of the counties which furnish the heaviest crops of buckwheat according to the late State census, the crop must have fallen off very considerably. The buckwheat crop there was estimated too small in the previous year.

In the State of New Jersey, which raises a comparatively large crop of buckwheat, (in the western part of the State,) this crop is said to have been "30 per cent. better" than in 1844.

The Belvidere Apollo thus speaks of buckwheat in Warren county: "Our neighborhood was visited by a white frost yesterday morning. Fortunately, a considerable part of the unusually large buckwheat crop of our county is cut, and much that remains standing is so far advanced as to be out of danger of injury from the elements. Our mention of a large crop means, that an unusually large quantity of the grain was sown, and that the yield will be generally heavy. We shall give our lowland friends substantial proof, presently, that 'auld Scotia' is not the only 'land o' cakes' in the world." In the central section, comprising Burlington and Monmouth counties, it is, however, supposed that this crop fell off largely, and the de-

crease has even been estimated as high as "one-half." Still, it is believed that there was a gain in the whole State of 15 or 20 per cent.

Pennsylvania furnishes about one fourth of the whole buckwheat crop, and its appearance the past season seems to have been quite different in the various sections. In Lancaster, and in some of the southeastern counties, there was "some advance"—from "10 to 25 per cent." In the former county it is stated that "the absence of frost to a period later than usual in autumn, must have had a favorable influence; which, taken in connexion with the fact that more of this grain was sown in consequence of the failure of wheat in places, warrants the conclusion that the crop may be fairly set down at 25 per cent. more than that of last year." In the eastern central section, lying along the Delaware and Schuylkill, it might have been "about 10 per cent. better." In the northeastern part of the State the increase did not probably exceed "5 per cent." It looked well in the early part of the season; but owing to the drought and early frost, there is not so good a crop. In the counties lying on the Susquehannah—both those bordering on Maryland, and those which occupy the central upper portion of the State—there was a decrease, it is thought, of from "25 to 30 per cent." In the northeastern part of the State there was a gain of "10 to 15 per cent." In comparing the information respecting different parts of the State with the census statistics of this crop in the same sections, we find that there was an evident gain, taking the whole State through, of 10 or 15 per cent.

Maryland raises but little buckwheat, and therefore we have but little information respecting this crop in that State. In the northeastern section it is estimated that there was a decided increase, and probably this was the case in the whole State.

In the northwestern part of Virginia there also appears to have been some gain on the crop of 1844.

In North Carolina it fell off. We have not, however, given our estimates in the table for this crop in these States.

In Tennessee and Kentucky there was also a small advance.

The accounts from the various sections of Ohio respecting the buckwheat crop are all favorable. In the north central portions, on the Reserve, as much more was sown, the crop is thought to have been more than double that of the previous year. The range of district lying west and northwest from this latter, also, it is believed, had a better crop by "25 per cent." In the northwest corner of the State, also, the increase is fixed at "one-half more." In the southeast section from the central, the crop of buckwheat was also considered better by "one-quarter to one-third." In the eastern central part, bordering on the Ohio river and Pennsylvania, it is judged to have increased "about 10 per cent.;" while in the southwest part of the State, from the centre, it was fully an average crop. In view of the census statistics for these different sections, in relation to the buckwheat crop, we believe that we shall not greatly err by estimating the increase to have been about 20 per cent. above that of the crop of 1844.

There is not a great deal of buckwheat raised either in Illinois, Indiana, or Missouri; but there was probably an increased crop also in those States. In Illinois the advance in some sections is fixed as high as "one-half."

Michigan exhibited a better crop of buckwheat the past season than in the previous year. The editor of the Michigan Farmer rates the advance for the State as high as "50 per cent." This is high authority, but we prefer to put it somewhat lower—say "30 per cent.;" as in some sections it has

fallen off as it is stated. In other sections it ranges from 10 to 50 per cent. advance.

The crop was a fair one in Iowa and Wisconsin. Taking the whole, the aggregate crop of buckwheat for the United States will be about 10,268,000 bushels.

MAIZE, OR INDIAN CORN.

This, as it is well known, is the largest of all the grain crops. Its importance is also fully appreciated, as there is no product which is common to all the States, that is so extensively cultivated. The varieties in the different sections are numerous, and continually increasing by improvement and the introduction of seed from abroad. As it is so generally cultivated, there is more frequent mention of its appearance and progress in the agricultural papers, and the public journals generally. A better judgment can thus be formed respecting it. The prospects of the corn crop in the summer in almost all parts of the country, especially along the Atlantic States, were most unpromising, especially from the drought. The evil, however, did not prove to be so great as was feared in some sections, though in others the corn crop suffered most severely.

New England, in proportion to her population, raises a large corn crop. In Maine the crop was about an average one. The Maine Farmer of July 11 speaking of its appearance, says: "A part of the corn crop looks very well bearing a good color, but rather dwarfish in size. Much of it, on this route at least, is afflicted with the *yellow fever*, or some other *yellow* disease; or else, as the boy said, the seed planted must have been the *yellow kind*. At all events, it has the yellow hue upon it, which is not a very flattering omen of a fair harvest. We have had too many cold days, and still colder nights, for the successful growth of corn. Our most congenial seasons for this crop do not yield a great harvest; yet many farmers every year succeed in raising enough for their own use."

In New Hampshire, as early as August, we are told, in an agricultural paper, that this crop "looks promising." In the southeastern part of the State it is said that it was probably "10 per cent. more." One informant adds, that "it is undoubtedly increasing in quantity; and next to wheat, it is considered the most desirable crop. The fodder from a good crop of corn is worth nearly as much as a crop of potatoes, and it is a fact that wheat will grow better after corn than after any other crop." Further to the west it is thought to have been "10 per cent. less." Higher up, on the Connecticut river, we are told, by a competent judge, that "Indian corn stood the drought remarkably well, and has given a very fair yield; except here and there, perhaps, upon knolls, and ridges, and high plains of a light dry soil." Estimating the crop according to the relative proportions given by the census statistics of this crop, we are inclined to believe that there was some increase—perhaps from 5 to 10 per cent.

The accounts from Vermont in all sections represent the crop to have been a fine one. The drought does not seem to have prevailed so greatly there as in some of the other New England States. The Burlington Press speaks of it as "uncommonly large and fine." The section of the State lying in the northeast corner, and along the Connecticut river south, also, we are informed, enjoyed a long warm season; and hence the crop is thought to have been "20 per cent. better." In Windham county it was a

fine crop; and it is stated: "Muck is the secret cause that has given us a greater growth of Indian corn than has ever been known in this county. Seven acres, presented to our own fair by seven different individuals residing in different towns in the county, gave an aggregate growth of 740 bushels, or about 106 bushels to the acre." The whole crop of the State, therefore, was probably as much as 20 per cent. more than in 1842. The drought severely affected the corn crop in the eastern part of Massachusetts; in the middle it was not so much felt, and still less at the western. In most of the towns in the northeast and central Atlantic counties it fell off from "10 to 25 per cent." In the interior, it is thought to have been "about 10 to 15 per cent. better." The Greenfield Gazette, in July, speaks thus of it: "Indian corn looks middling well, but needs more warm weather and rain; the corn will be generally good." In the western part of the State, we learn from the Boston Cultivator that the prospect was poor. A correspondent says: "*Indian corn.*—Any one acquainted with the season may well wonder that there is any growing. It has had many and severe obstacles to contend with; for, in addition to the cold, unpromising May, it was thoroughly cut down by the frost on the 8th or 30th of that month. It, however, started again; and though backward, it now gives, if the season hereafter is favorable, a tolerable prospect of a good crop." At a later date, however, since the harvest, an informant writes to us: "The Indian corn has not been better with us for many years. The season, after the 1st of June, was warm, dry, and uniform, which is natural to this crop. Some pieces on dry land were affected by the drought; but, as a general remark, the season was admirably adapted to this crop. The report of the committee in Berkshire county on about 20 pieces was over 100 bushels to the acre. It is thought to have been in that section "25 per cent. more" than in 1844. We presume the average increase for the whole State was about 10 per cent. The crop of 1844, it will be recollected, was a good one.

The corn crop of Rhode Island is described in July as being very promising, and there seems to have been at least 15 or 20 per cent. more. Great fears were likewise entertained in Connecticut on account of the drought, and many pieces of corn suffered. Had not timely rains at last been enjoyed, the whole State would have experienced a great falling off in the crop. The injury, however, did not prove so serious as had been apprehended; and on the average, probably, we may allow an increased crop of about 10 per cent. over that of the preceding year.

The prospect of the corn crop during the summer in New York was most discouraging. The apprehensions entertained were not, indeed, realized to their full extent, though there has been some decrease. A New York agricultural report, for the months of July and August, speaks thus of this important product:

"For July, *corn* has had a miserable chance, and the only wonder is that it looks so well. It is now in tassel; and if we had had even a moderate supply of rains, the yield would have been very great. The ground is now so parched that the leaves begin to curl; and, unless we have speedy showers, the crop will suffer greatly."

In August: "This great staple never ran so narrow a chance of a total failure as this year. At the close of July, farmers had serious thoughts of cutting up their corn for fodder; the leaves were curled up; the silk appeared, but without any signs of the ear filling out. Fortunately, the rains

came on just in time; the color is now changed, the ear is full, and the crop is saved; an early frost would not even jeopard the prospects of the farmer."

In the western part of the State, a Buffalo paper gives the following statements of the corn crop in that vicinity for June and July:

"The corn crop, of which the most dubious forebodings have been indulged *by some* in this quarter, has as yet exhibited no feature to warrant the conclusions that have been arrived at. Farmers know that corn does not require hot weather before the 1st of July; and that to be killed down by frost when two or three inches high, is far from certain damage to the crop. Prior to July, cool, damp weather is favorable to corn. This forms the roots; while July and August, if hot, complete the crop, and insure a rich harvest."

Again: "*Indian corn.*—This important crop may yet be a fair average. Much, however, depends upon this month, and the first two or three weeks in September. If we have warm weather and frequent showers, and the frost holds off till past the middle of September, we shall have a good crop."

In August, we have the following notice from the Batavia Times: "*Corn* is now going ahead rapidly, and there is every indication that it will turn out well."

In September, mention is made in one of the public journals of a whirlwind, which passed through the northern part of the county of Orleans, leaving "a track of some 160 rods wide, and 17 or 20 miles in length." The *corn* is stated to have suffered in some places very severely from its ravages, especially where it was stacked. The drought was severely felt in the eastern part of the State; and from the information received respecting the crop since it was gathered, we learn that there has been a decrease varying from "10 to 15 or 20 per cent." In the upper part of the State, on the northeast, the crop varied from "5 to 10 per cent. less." Lower down, about the centre of the river counties, the falling off of this product was from "20 to 25 per cent." The same was the case yet further towards New York, for the most part. In some counties, however, on account of the greater quantity sown, the crop was "as good, if not better," than in 1844. On Long Island, at the further part, the corn crop, it is judged, was "10 per cent. less in quantity" than in 1844, but of "a very superior quality." "The drought diminished the quantity to some extent, although a dry season is much better than a wet one for this important crop. The *eight-rowed white Dutton corn* is generally considered the best by our farmers." Many of the ears raised this season, on one farm, are said to have been "15 inches long." In the southeast corner of the State, and back from the river, west, the decrease is said to have been large in consequence of drought; and by some the loss thus sustained is estimated as high as "50 per cent." As a general thing, however, we believe that it was not more than 20 or 25 per cent. less than the crop of 1844. From the southern border of the State, and northward west of Hudson river, and reaching onward to the Mohawk river, there was a gradual improvement. There was more sown in some parts of this section, and the crop is estimated to have increased along the Mohawk valley, and northerly, "10 or 20 per cent." Somewhat further west it fell off; and in the county of Oneida the decrease is said to have been "one-fourth." In the counties northwest of this last, towards the Lake, it was "considerably better." The crop in Onondaga county was

"an average one;" but the drought seriously affected it in Cayuga and Cortlandt counties. More to the southwest, however, it was better. In Chemung county it is said to have been "very fine;" and, including the adjoining counties of Tompkins and Yates, the average increase is stated at about "10 per cent." In Seneca and Wayne counties, it is supposed to have been still more. Further to the west and north, again, the drought seems to have been felt; while in the southwestern and western sections there was an increase estimated at from "15 to 20 per cent." The crop for the whole State has, on the whole, fallen off from that of 1844 (considering that given in the late census by the State as our basis of comparison) about 10 per cent.

In New Jersey, although the drought prevailed, yet there was an average crop; and in some parts, especially in the central counties of Burlington and Monmouth, it is thought there was an increase of from "10 to 15 per cent."

Pennsylvania raises a large quantity of corn; and, judging from the accounts received respecting it, though affected by the drought, it did not suffer equally in all parts of the State. In Lancaster and the southeastern section generally, the amount gathered seems to have been "fully equal" to that of the previous year. One informant says: "In the northern part of the county the season throughout was dry, and the corn crop was light, which was, to some extent, the case last year; but in the southern part of the county, where the rain was sufficient to nourish the plants, the crop was rather superior to that of the preceding year. The average crop for the county was about the same as last year." So of Chester county it is said: "The corn crop, though much retarded in many instances by the ravages of the cut-worm, affords a tolerable average, the fall being very favorable to the ripening of the plant." In the counties of Lehigh and Bucks, also, it is said to have been "very good; equal in some places, and even superior," to the crop of 1844—perhaps reaching as high in certain cases as "20 per cent." More to the northeast, the drought somewhat lessened the amount raised, and it may have fallen short "5 to 10 per cent." In the section on the Susquehannah, and on the Maryland line, comprising Adams and York counties, it is thought to have suffered a still larger decrease, and by some it is fixed as high as "50 per cent. less." This, however, we believe to be too much. In the northwestern part of the State it was a better crop by "15 per cent." On the whole, regard being had to the comparative products of the various sections as exhibited by the census of 1840, we believe that the crop for the whole State may be fixed at an increase of about 10 per cent. over that of 1844.

The same was probably the case in regard to Delaware; which State, in proportion to its population, raises quite a large corn crop.

In Maryland the following are some of the earlier notices respecting this crop. In June, the Torchlight says: "The prospect for *corn* is not so encouraging, the severe drought having injured it to a great extent." In July, from the Eastern shore, the account from Centreville is—"*Corn* looks well throughout the county, and, unless some very injurious drawback occurs, an unusually fine crop may be anticipated." Again: "The belief is general, says the Frederick Examiner, that the corn crop will be a very short one. So great has been the alarm in regard to it, that we have heard of individuals purchasing their corn in advance of the market, and at a high price. But, thanks to an all-wise Providence for refreshing rains lately;

since which the prospect of the crop is brighter." The Baltimore Sun, in the same month, also states: "Corn, as yet, is very promising." In the American Farmer a correspondent, writing from Carroll county, says: "The corn crop with us is good, considering the season. I shall make fourteen barrels to the acre, and perhaps more—the effects of deep ploughing, liming, and close planting." So in August, likewise: "The corn, generally, has suffered very much from the drought. The early planted, in parts of this and many of the adjoining States, will be irrecoverable to a considerable extent; the later planted may do better, if we have seasonable rains this month. We fear it will be a very light crop throughout all the middle and southern States." And, in another journal: "Anne Arundel county, in this State, was visited by a tremendous tornado on Sunday the 3d instant. Fields of corn were literally destroyed, and stripped of every particle of fodder, and all other products of the soil suffered in like manner." Somewhat later we find it mentioned, that in some parts of the State the corn crops are improving, and that there is reason to believe there will be an average crop." From other sources, also, we hear that the crop fell off; and in the northeastern section, especially, it is thought to have done so at least "one-third." It will be recollected that the crop of 1844 decreased from that of 1843. We believe, therefore, that a decrease of 20 per cent. for the last crop, in comparison with that of 1844, may fairly be allowed. The sections of the State already referred to probably raise full half of the whole crop, if not even more.

The early accounts respecting the corn crop of Virginia were not unfavorable. In July, a Richmond paper states that "it will be good, judging from its healthy color." In Campbell and Bedford counties, however, it is stated in another journal, that "this crop is worse than any during the present century." In August we find great complaints of the drought. The following is from the Richmond Compiler: "The corn crops in all eastern Virginia, except in the rich lowlands on the tide-water, will be a failure. The tassels of the corn were destroyed by the intense heat without rain, and furnished very little pollen; the consequence is, that the ears are, a large portion of them, without grains, while few are filled. Some fields look as if they would make a tolerable yield; but, upon taking off the shuck from the ear, an exhibit of grains few and far between is made, which is distressing to the farmer." Again: "The inhabitants of counties within a circuit of one or two hundred miles are now sending to Richmond for meal. Some of the farms on the lower James river will scarcely yield half a crop of corn, even if they now have the advantage of copious showers." The Richmond Whig says that, while particular counties and neighborhoods will fall short of an adequate supply of corn, the aggregate crop in the State of Virginia, in conjunction with large supplies of the old crop which still remain on hand, especially below tide-water, will not only be ample for home consumption, but yield a large surplus for coast transportation. "West of the Blue Ridge, and east of the falls of the rivers," adds the Whig, "the corn crop is believed to be an average one. In many of the midland counties it will fall short. The wonder is that so much should have been made in defiance of so unprecedented a drought. It speaks well for the improved methods of cultivation. Twenty years ago, such a drought would scarcely have allowed seed corn to be raised." The Clarksburg Republican states that, "in northwestern Virginia the *corn* crop will be a very fine one, unless there should be early frosts in the fall." A correspondent of the Southern Culti-

vator for October says: "The *corn* crop is literally cut off." The editor of the Southern Planter for October, alluding to this crop, says: "Upon the subject of the corn crop we have such conflicting accounts that we hardly care to publish them. There is no doubt that the crop, take it all together, will be a short one; but, unlike the tobacco, the corn does not go to a common market; and being, on account of the expense of transportation, confined to narrow limits, the price will vary in different neighborhoods. The unexampled vegetative powers of the month of August worked wonders on the late corn; and, in many places where the farmer had despaired, a tolerable crop has been made. We extract the following from a letter received from a large planter and most valued friend, in Mecklenburg: 'We have experienced one of the most distressing droughts that I have ever known; the few river mills which could grind refused to grind any thing but corn, and it was with great difficulty that the country could be furnished with corn meal for a distance of forty miles around us. The navigation of the Roanoke ceased, and up to the first instant we were actually threatened with a famine; since that time we have had fine seasons, and our prospect for corn has brightened far beyond our most sanguine calculations.'" Later accounts which we have from other sources correspond with the foregoing. Thus, of the central counties of Bedford to Madison, east of the Blue Ridge, our informant says: "Of Indian corn, after minute inquiries in all parts of the district, I am satisfied that there will not be more than half the usual crop. The severe drought, commencing early in the spring and lasting until the first of August, blasted the crop almost entirely in many sections." In the southern central section, bordering on North Carolina, the decrease is estimated at "50 per cent." In the counties lying east of the Blue Ridge, comprising the range on the James river from Campbell to Fluvanna, it is also thought to have fallen off "one-half" from the crop of 1844. In Amelia county and vicinity, it fell off from "25 to 33⅓ per cent." In the northwestern corner of the State, and also in the section lying along Kanawha river and its branches, it is believed to have decreased "25 per cent." Taking the whole State, it is thought that the average deficiency will equal 30 per cent. The following, relating to this crop in different sections, are taken, respectively, from correspondents in the Southern Planter for the month of October, and in the Dollar Farmer. The suggestions in both are valuable.

"About the 1st of August I returned from quite an extensive tour on horseback through the counties at the foot of the Blue Ridge, from Campbell to Orange. I found that the *corn* was almost given up. It was really distressing to see the fields of hard-working poor men, upon which they depended for bread, bearing a slender, sickly looking little stalk, with no ear. Corn had already risen to $3 50 and $4 per barrel, but those who had old corn were holding on for higher prices. I saw many farmers who were eating their wheat, and refused to sell at any price, quite confident that they would not make bread from their corn crops. As I approached the lower country it continued to improve, at least as far as the neighborhood of Charlottesville, where I saw some of the finest corn I have ever seen growing. The corn in the neighborhood is pretty good, though greatly injured by the late unprecedented drought; but this that I speak of was decidedly the heaviest growth of any thing I have ever seen on land. It was the crop of our friend, Mr. W. Gilmer. He resides about six miles west of Charlottesville, and invited me to ride through his field with him to show me his

corn. I will not attempt to describe what I saw: first, my account would be incredible; and, secondly, I could neither do justice to Mr. G. nor to his field. As I said, we rode through it, but it was more laborious than riding in a thicket of woods; for though we went in the widest row we could find, it was difficult to keep the blades and stalk from dismounting me. He has of it, I guess, some fifty acres of immensely rich land, (creek low grounds,) and his calculations are, to make on some 20 to 25, on some 25 to 30, and on some from 30 to 40 barrels per acre. Now this seems wild, but it does not seem so to those who have seen the corn growing. The rows are 5 feet apart, and the corn was literally sowed along in them. I allow that they average 4 inches. Every stalk has an ear or shoot on it, and the tassel was beyond the reach of my cane, and I on horseback; and the stalk has a beautiful color from the root. Mr. G. seemed to think he would make 35 barrels on a considerable portion of his field. I cannot risk an opinion; but if every stalk brings a nubbin, and 1,000 of them are allowed to the barrel, (500 ears is considered the number,) I calculate, from a table in the Farmer's Register, vol. 2, p. 592, showing the number of stalks per acre at given distances, that there will be near 30 barrels."

"I observed that on some of the best lands on James river the corn is tolerably good; that is to say, will yield about one-third as much as the crop on the Kanawha. I perceive that they plant their corn on James river $5\frac{1}{2}$ to 6 feet apart, and cultivate it with ploughs. This is a sad error. It should be planted 3 feet each way, harrowed as soon as up; then a single furrow run on each side of the row, throwing the earth from the corn; then another furrow on each side, throwing the earth back again; and then the cultivator passed *once* through each row whenever grass begins to appear, or whenever the earth begins to bake or become compact. They say their soil is of such a nature that this culture will not do; that it is stiff, and must be worked with the coulter and plough. My answer is, that they have not complied with the requisite conditions. They must plough deep, double-furrow plough, or use the sub-soil plough after a deep furrow of the common plough; and they must make the soil more friable by means of clover, manure, and lime. I know of no soil in Kentucky that requires the coulter in cultivation, or that may not be tended with the cultivator alone, except when the rains are long continued. No soil can be in good condition that will not admit the cultivator. I fix upon 3 feet for the rows, because that is the distance which a good cultivator will sweep clean. It is of the utmost importance that a single passage through each interval should suffice; this enables the farmer always to keep the grass under command, and the soil loose. The great secret in cultivating the soil, as in war, is prompt and rapid movement at the proper time; and promptness, decision, and energy, and an eye that takes in the whole field of operation, are hardly less essential to the farmer than to the general. Hence the extreme scarcity of good farmers. Another advantage in planting at three feet is, that the corn will more readily keep out the grass. From 1 to 4 stalks may be left in each hill, according to the soil and the views of the farmer. I much prefer, after much experience and observation, close planting, and I should leave at least 2 stalks in each hill in the James river lands."

The corn crop of North Carolina also suffered most severely from the drought, as well as the early frost. Thus, in one of the public journals in June, we find it stated that "in Bladen county, N. C., the frost of the 1st of

this month was severe enough to kill corn which was nearly three feet high. One planter had ploughed up a 30-acre field of corn of that description, with the design of replanting it. It is swamp land, in a low situation." In some sections it is said to have been literally cut off; in some sections, however, it proved better than its early promise. Thus, the Raleigh Register says: "The streams all over the country are drying up, and in some parts persons go forty to fifty miles to have their corn ground into meal. In this city many of the wells have given out; a circumstance rarely if ever before occurring. And yet we are astonished to see how well vegetation looks, particularly the corn crop."

"A letter from Halifax, N. C., expresses the opinion that as much corn will be made this year as last, in that region."

Again: "A letter from Hamptonville, Surry county, N. C., speaks of the corn crop, which was then being gathered, as short of an average; it was selling at 40 cents a bushel from the heap in the field. Heavy biting frosts were felt about that time, and the week before they had floods of rain, which was greatly needed, particularly in the counties lower down, to enable their mills to grind. The past summer, in that district, was pronounced 'the dryest of the dry, by the oldest inhabitant.'"

"The crops in this section of the State, as we have before stated, are very fine. In Hyde county, it is thought more corn will be gathered this year than in any one year heretofore. It is estimated that Hyde will export of corn alone 150,000 barrels, or 750,000 bushels; which, at 40 cents a bushel, amounts to the handsome sum of $300,000. Pretty well for one small county of only 6,500 inhabitants."—*Washington (N. C.) Whig*.

Hyde county, lying north of Pamlico sound, and with more marshy soil, it is probable, did not feel the drought as severely as in others more dry in soil, and hence less able to resist the heat, extreme as it was.

The accounts received from the interior portion of the State very generally represent the crops as having suffered greatly, and as having been largely cut off. The range of counties from Ashe to Caswell, in the north and west parts of the State, it is said, did not yield more than "one-third of a crop." So of the western central section, near the Catawba and Yadkin rivers; it fell off "from one-half to two-thirds" from that of 1844. It appears, therefore, from the best information that we can obtain, that there was a very considerable decrease of the corn throughout the whole State; and we feel authorized to fix the estimate, as we have done, at about one third less than the crop of 1844.

As we have already seen, in our remarks under "The Season," the drought was greatly felt in South Carolina; and from the various notices we find respecting it, we believe the corn crop in this State to have felt its effects most severely. The following accounts will enable us to observe the progress of the corn crop in some sections of this State:

From the Charleston Mercury: "*Darlington C. H., South Carolina, June* 30.—We are in the midst of a remarkably dry season—the dryest that has occurred since 1819; and serious apprehensions are entertained for the corn crop, which has now reached the critical stage of shooting, and will soon, without rain, be beyond remedy."

Extract of a letter to the editor of the Charleston Mercury, dated "*Marion C. H, July* 1, 1845.—We have been almost parched up for want of rain, and the crops, with few exceptions, look badly; the thermometer ranging daily, during the last week, at from 90° to 100°. The corn crops, especial-

ly, will be very short, both here and on the west side of the Peedee. Some of the best farmers do not expect to make over half a crop."

Again: "In this section the prospects of the agriculturist are bad—very bad indeed; the corn crop cannot now, under the most favorable circumstances, be much more than half an average one. Those who have a sufficiency of corn, and in ordinary seasons would be willing to part with a portion of it, now refuse to sell at any price. The article has already reached 75 cents by the quantity, and will doubtless soon be $1 per bushel. We have never known a more unfavorable season, or heard more general or well founded complaints, and really fear that there will be much distress before another crop can be planted and gathered. Some fields of early corn we have examined, we feel confident, will not yield as much as the seed planted; and unless we have rain shortly, the late planted corn will be entirely lost."—*Cheraw (S. C.) Gazette.*

"*Abbeville (S. C.) C. H., July* 9.—*The drought.*—The oldest farmers amongst us say that the present drought is unprecedented in the history of this country; and that the wants and distress of many in our district will be great. It is the opinion of many with whom we have conversed, on sale-day, that they may be able to raise corn enough for bread for their families, but not for their cattle. A gentleman, on whose judgment we rely, told us that from 100 acres of corn belonging to one of his neighbors he would not be able to gather much more than a bushel, so completely had the drought destroyed it. On sale day nothing could be heard of but drought and prospects of famine; and the inquiry from every one is, Where can we get corn?"

"The prospects of the planter are not only gloomy, but perfectly desperate. Bottom lands planted in corn will scarcely make one-third of a crop; and most of the high lands in the middle country will yield but little more than the seed which was planted. In addition to all the horrors of destitution by drought, the chinch bug has attacked many plantations with such violence, that, in large fields, not a blade of corn has been left alive. Many farmers are replanting entire fields."—*Columbia South Carolinian, July* 16.

"Let the season be as it may from this out, we believe it is not within the bounds of probability that the corn crop of this State will reach half an average one. So far as our own observation has extended, we have no doubt it will fall short of this estimate."—*Cheraw Gazette, July* 22.

The Georgetown Observer, of July 30, says: "The corn crop is short of an average one."

Later, in August, we find the following statement, quoted from the Richmond Whig, in one of the public journals: "A letter written at Spartansburg, S. C., on the 9th instant, states that a meeting of the farmers of that district was held a few days previous, to take into consideration the state of the provision crop. From the authentic information received by the meeting, it appears that the corn crop of that part of the State will fall off fully two-thirds; and the whole upper country is said to be in about the same condition. The surplus of the old crop in the adjoining counties of North Carolina had been nearly exhausted by the demand from South Carolina, and supplies were being obtained from Tennessee at ruinous prices." The letter adds: "The crop that is now making is almost exclusively confined to the bottom lands; the upland, in many places, is so total a failure that many are cutting down their fields to save the stalks for fodder. There are hun-

dreds of acres that will not make the seed planted. I know men, who in ordinary times are called good livers, that will not make as many pecks as they usually make barrels of corn. Men speak with fear and trembling of the prospect before them; and those who have corn, feel and know that they will not be long better off than those who have none."—*Richmond Whig.*

The Charleston Patriot of August 1st states: "In Richland, Lexington, Orangeburg, Barnwell, and other middle districts in the State, the corn crops in many places are irremediably ruined—literally burnt up along the face of the earth."

The views given above are confirmed by the accounts we have since received from other sources. Thus, in the northeast section of the State, it is thought the injury sustained from the drought was at least "15 per cent." West of this last, along on the Santee river and its two great branches, both the drought and the army worm are complained of, and the crop is estimated to have fallen off "38 per cent." In the northwestern corner of the State, the same complaint is made; the deficiency is believed to have been "one-half," while in Spartansburg, and the counties east, it is stated to have been probably not less than "75 per cent. less" than the crop of 1844, it being "an almost entire failure, except on bottom lands; thousands of acres of land not producing the bushel to the acre of the upland." In the west central part of the State, also, comprising the counties lying between the Congaree and Savannah rivers, the falling off is estimated at "about one-third." It is evident, therefore, that the decrease in this State has been great. In forming our general estimate for the State, however, some regard must be had to the fact that the crop of corn for 1844 was a deficient one. The average decrease for the whole State can scarcely have been less than 35 to 40 per cent.; perhaps even more. The lower counties being more moist, probably suffered less than the upper ones.

We give the following notices, which we have gathered from the public journals, indicative of the progress of the corn crop in Georgia, in July:

"*Sumter county, Georgia, July* 4.—Our section of the county has been injured severely by the drought. The corn crop, in the aggregate, is cut off one-half."

The Hamburg (Ga.) Journal, of the 5th instant, says: "The weather at this place still continues favorable, but warm. The corn crops promise an abundant yield to the husbandman.

"The corn crop continues abundantly promising in many parts of this State, although the back counties are suffering from a protracted drought."

[From the Savannah Republican, July 11.

"*Rain! rain!!*—Yesterday our city and vicinity were blessed with the heaviest fall of rain which has been known since the 1st of January last. The effect on the temperature was very perceptible. We are inclined to think that it extended for a considerable distance along the coast, as well as in the interior. Its effect upon the crops—the corn, particularly—will be slight. In no event can there be more than one-half a crop in the State."

A writer in the Macon Messenger says: "There has been much alarm recently at the prospect of a very short crop; and, consequently, corn has risen to a very extravagant price. It had sold here from $1 to $1 25 a bushel. The price of corn in Savannah is 55 cents a bushel; and some

has already been received from there and laid down here at 65 cents. There is abundance of corn in New Orleans at 32 cents per bushel, and will be furnished here in a short time at 50 cents; on the upper line of Georgia it is selling at 62½ cents." He remarks that, "with regard to the present crop, the prospects are now far better than they have been, and that all the late corn is doing well from the recent rains, and that there is no danger but that plenty will be made in the State to supply the wants of the people, though the early part of the crop has been considered as injured in some small sections; yet, through two-thirds or three-fourths of the State, it is an average one, and in many sections it was never better. Of this he is satisfied, from personal observation for nearly 200 miles, and from authentic information from numerous individuals, both travellers and planters."

In August, in the northwest corner of the State, the Lafayette Herald says: "While accounts reach us, from every quarter, of the protracted drought, we are still blessed with abundant showers, and crops of corn are very promising. If the weather continues seasonable, ours will be the Egypt of Georgia."

In other sections, however, the report is unfavorable. Thus the Griffin (Ga.) Jeffersonian, of the 14th instant, has the following:

"There is no mistake now about the drought and short crops. From all quarters of lower and middle Georgia the report is the same, that the drought is excessive, and not more than half crops of corn can be made."

"The corn crop, also, in proportion to the demand for consumption, is the shortest that has been made within the last twenty years."—*Macon Messenger.*

Again, in a public journal: "One of the most intelligent and observing planters in Georgia has lately made a circuit of some three hundred miles, a portion of it through the very heart of the State, and gives it as his opinion that the corn crop will fall short one-half of what it was last year, if not more. This, we believe, will be the result throughout Georgia; and the greatest *economy* and *liberality* must be exercised to prevent much suffering, or evils of *greater* magnitude." "The corn crop of Georgia is represented to us by some of the Georgia papers as deplorably bad. The water courses were all low, and the mills would have to stop at once, without the blessing of rain."

Our accounts since the harvest refer principally to the northwestern and central sections, west of the Ocmulgee river. In the former, it is stated: "Indian corn is our principal crop, and this has been cut short at least one-third, from unusual drought during the summer." In the latter, it is also thought to have been "not half an average crop." From the accounts thus given, we think we do not greatly err in fixing the decrease at about the same as in South Carolina.

It is probable that in Florida it was very similar. In July it is stated: "*Corn*, however, has suffered greatly from the drought; and, the season being so far advanced, a full crop is not looked for or expected."—*Tallahassee Floridian.*

The following statements are taken from the American Farmer of October last. They confirm the views we have given respecting the corn crops of South Carolina and Georgia. The papers in South Carolina present us with very distressing accounts of the sufferings of the poor, from the failure of the corn crop. The Greenville Mountaineer says that hundreds are leaving the State, and the editor says he regrets the necessity of

advising others to follow them. The Ashville (North Carolina) Messenger says "that numbers of wagons pass through that place daily on their way from South Carolina to Tennessee to procure corn, as the corn crop in a large portion of South Carolina is entirely destroyed. These wagons are sent from 150 to 200 miles for corn! Great numbers of poor people are leaving the State and going to Tennessee. A hundred and fifty persons, consisting entirely of poor families, passed through this place last week." The Georgia Constitutionalist says "that the want of water to turn the mills is another great evil, and, in some instances, they have had to send 50 miles to get meal." The editor of the South Carolina Temperance Advocate says "he has traversed different sections of Lexington, Newberry, Laurens, Greenville, Pickens, Anderson, Spartanburg, and Union districts; and the result is, our firm conviction, founded on close personal observation—fortified, too, by the opinions of judicious men—that the crop of corn will prove well nigh a total failure."

The drought does not seem to have injured the corn crop as much in Alabama as in others of the adjoining States, though it was doubtless somewhat lessened. In May the appearance of the crop was promising. The Gazette of the 14th instant, published at Cahawba, says: "The prospect now is very flattering for good crops. Some of our farmers tell us that they have never seen *corn* thrive better. A great many of the planters in this section have planted more corn than usual, and, of course, a less quantity of cotton." Again, in June, it is stated in a public journal: "The drought, which has threatened some sections of this State, has been happily terminated; the late showers have dissipated all fears as to the result. The gardens have been severely injured, but the *corn* crop will be abundant." So, in July, the Montgomery Journal states that "the corn crop is looking well." In August, however, from Montgomery it is stated that the corn crop will be very short in that section, in consequence of the long drought. In the southeastern section of the State, from a very intelligent informant and a good judge on such subjects, the corn crop is estimated to have been "about equal" to that of the preceding year. In the central part of the State, bordering on the Alabama river on either side, it is said to have been "one-third less," as it was materially injured by the drought. In the northeastern the falling off is represented not to have been so great; perhaps "about 15 per cent." On the whole, for the State, we suppose it may have been about 25 per cent. less than the crop of 1844.

In Mississippi, from what we learn respecting its progress, and the state of the crop when gathered, it also fell off; though not so largely as in Alabama. Thus it is stated in July: Extract from a letter, dated Yalobusha county, Miss., July 13, 1845: "From every appearance at present, the corn crop in this section will fall far short of a good one. There has been but very little rain this season, and that little has fallen only partially, so that a large portion of the country still remains very dry and the corn very much shrivelled."—*Mississippian, July* 23.

Again: The Creole (Canton, Miss.) says: "Showers have been frequent. The crops look as well as could be expected, but neither the corn nor cotton crop will be a large one."

The editor of the Southwestern Farmer, also, in the same month says: "We have seen of the growing crop in all probability more acres than any other man in Mississippi. We have made particular inquiries, and also examined for ourself, and we have made up our mind that the corn crop is

more dependant on seasons than usual. Although it generally bears a good color and is clean, yet it is more irregular in height than we have ever seen."

From other sources we also learn, that in the northeastern section of the State, and west of the Tombigbee river, owing to the drought, the crop is "20 to 25 per cent. less" than in 1844. In the southwestern portion, however, west of Pearl river and south of the Yazoo river, it is thought to have been an increased crop—perhaps "15 per cent. more" than in the previous year. On the whole, we believe that the crop has fallen off in the State from 10 to 15 per cent. It is, however, a comparatively small crop in this State.

The early appearance of the corn crop of Louisiana appears to have been quite promising. Thus, in May. The Alexandria Red River Republican of the 12th inst. says: "We have heard that two or three of our planters have determined to try a corn crop this season, planting very little cotton. We think this step a good one. The crops will mature much earlier than those of the west, and will, of course, be the first in the market, with the chance of a reasonable price. The yield here to an acre is equal to that of any other portion of the country."

"The early corn is unusually fine; much of it is already in tassel. The late planting has been much injured by heavy rains."—*Planters' Banner, May* 24.

Again, in July—

Attakapas crops.—The Planters' Banner of the 12th inst. says: "The greater part of the corn crop is fast ripening. Within the last few weeks we have had an unusual quantity of rain for the season, which will occasion the loss of much fodder."

The Concordia (La.) Intelligencer states that "the crops in that neighborhood have been injured by the unfavorable weather."

In the northeastern part of the State, bordering on Mississippi, and reaching back to the river, we are informed that the corn crop was "20 per cent. heavier" on the alluvial lands, but lighter "on the uplands;" supposed to be an average of "15 per cent." Taking the whole State through, we believe that it will average 10 per cent. more than in 1844.

In Arkansas some complaint is made of the drought; but, on the whole, there seems to have been a good crop—perhaps ten per cent. more than in the previous year. More new land is brought under cultivation from time to time, which no doubt exerts some influence.

In a public journal it is said: "The corn crop in the Red river and northern counties has been greatly injured by the drought."

The editor of the Northern Standard mentions that the neighborhood of Clarksville is the only section of the Red river counties where there will be much corn for sale. He states, also, that "the corn in the Choctaw nation is burnt up."

Again, in June: "In Arkansas, every prospect of an abundant crop seems to be realized. As early as the 24th ult. the *corn* in some parts of the State was said to be 'waist high.'"

The crop in Tennessee—which State, according to the census, stands foremost among the corn-growing States—was fine. The papers of that State, in June, speak of the crop as "larger than for many years; extremely promising—bids fair to be an abundant yield," &c. From accounts re-

ceived since the harvest, also, it is estimated at 10 to 20 per cent. more. The average crop, probably, would equal if it did not exceed 15 per cent.

In Kentucky, also, the accounts are equally favorable. In the section of the State which lies west of the centre, the crop is stated to have been "20 per cent. more." On the south, also, more. In the central to the northeast, "very fine—20 per cent. more." Still further to the northeast, and east of this last, about the same advance; and in the southeast, "remarkably good —20 per cent. more." Taking the whole State, and making due allowance for overestimates, we believe we may safely put the increase of the crop over that of 1844, at 15 per cent. It may, perhaps, overgo this, but we deem it most likely to be correct to add only 15 per cent.

Ohio produces a large crop of corn, and is among the foremost in the amount furnished by the western States. We notice in one of the public journals a statement which shows the advance of the season in one part of the State, though we know not precisely to which section it refers. It is as follows: "We finished planting corn on the 26th April; this is a week or ten days earlier than usual in this part of Ohio." In the month of June, the Cleveland Herald thus notices a check given to the growth of this crop in that neighborhood: "The frost last week cut the *corn* in the lake counties so closely that only a part will sprout again, and the soil is so exceedingly dry and parched that farmers are at a loss whether or not to replant."—*Cleveland Herald.*

In the Ohio Cultivator it is stated, by the editor: "*Corn* is now advancing with great rapidity. We have just returned from a tour through much of the best corn region, and have no doubt that the crop will prove at least an average one." A letter from Butler county, addressed to one of the public journals, also says: "Notwithstanding the drought, the *corn* promises to be a fair crop." Again, in July: "The State Journal of the 5th instant reports the crops at the north and on the lake shore, where the drought has been most severe, as fast reviving, and likely to turn out more than an average yield; at least larger and better than last year." The Ohio Statesman of August 6, published at Columbus, contains the following mention of the appearance of this crop: "The editor has just returned from a short excursion into the country, and he was pained to see many cornfields that had been much injured by the grub-worm and other causes. There are, however, some fields that look well." In the same public journal, but of an earlier date, we believe, is given the statements respecting this crop in quite a number of counties, as they were furnished by persons who were acting as jurors at the session of a court in the place of its publication. We quote them exactly as we have found them in the above named journal—

"*Lorain county.*—Crop very poor; mostly cut off by frost.

"*Clermont county.*—First rate.

"*Lake and Starke counties.*—Prospect for corn good.

"*Highland county.*—Very good.

"*Richland county.*—Tolerable.

"*Tascarawas county.*—Promises well.

"*Meigs county.*—Looks well: bids fair to yield an average crop.

"*Fairfield county.*—Looks well.

"*Guernsey county.*—Looks well, though short—a favorable fall will make a full crop.

"*Hamilton county.*—Prospect of the corn crop generally good.

"*Warren, Butler, and Preble counties.*—Similar to Hamilton.

"*Green county.*—Corn good."

A correspondent of the American Agriculturist, under date of September 20, writes: "The fields on the Reserve, which, in the earlier part of the season, were exceedingly parched by drought, were looking somewhat better, and much of the corn was full eared and thrifty, but so backward that an early frost would nip most of it before sufficiently ripe to withstand its effects. So severe and long continued a drought has probably never before been experienced, or at any rate exceeded, in this or any other State." The following statement speaks of Aurora county. We apprehend that the township of Aurora must be meant. It shows the effect of the drought, however. The Cleveland Herald says: "Some of the dairymen of Aurora county have been into the southern portion of Ohio and contracted for some hundreds of acres of standing *corn* and stalks, on which to winter their cows. A gentleman from near Columbus also came into Aurora, and contracted to keep 500 cows through the winter at the rate of one dollar per month. Another gentleman was allowed to go into the yard of an extensive dairyman and select cows at five dollars per head. Two-year-old steers are selling at from three to five dollars per head."

The accounts we have received since the crop was gathered are, on the whole, however, encouraging. In the central section, including the important counties of Delaware, Marion, and Richland, the increase of this crop is variously estimated at from "20 to 25 and 30 per cent." North of these, and towards the northeast, it is estimated, on account of much more having been planted, as high as "40 per cent. better" than 1844. In Starke and Wayne counties it was "an average crop." Eastward, and bordering on the Ohio river and Pennsylvania, including Jefferson, Carroll, and Columbiana counties, it was a "fair average crop; equal to that of the previous year." South of the centre, on the Scioto river, "about 25 per cent. better," as there was a "short crop there the year before." In the counties of Perry, Morgan, and Washington, it was "nearly one-third better;" "the drought and late frosts seriously affected the corn crop in the early part of the season, but the latter part was more favorable." In the northwest corner of the State, bordering on Michigan and Indiana, it was "far better." Further to the east, however, and along the lake, there seems to have been a small decrease of perhaps "10 per cent." In the southwest part of the State, the crop is variously estimated to have increased from "20 to 30 per cent." The American Agriculturist for November contains a communication in which the following remarks are made respecting the corn crop in southwest Ohio. The writer is an experienced judge of agricultural subjects: "The corn raised here is universally the gourd seed, which, from long experience, is found to be the best producer, wherever warmth of climate and depth of soil are sufficient to develope and mature it. The yield, under ordinary cultivation, without manure, varies from forty to sixty bushels per acre; but, with manure and good attention, it will sometimes average one hundred. It is usually planted about four feet apart each way, with three or four stalks left in a hill. Some plant nearer, and leave fewer stalks together. It appears much thinner in the field than a luxuriant growth of northern corn. That planted on the uplands, on a lighter soil, is still more scattered, and from its great height appears thin and spindling. I doubt if many of the fields which met my eye out of the Miami and Scioto valleys would exceed twenty-five bushels per acre. This can hardly be profitable farming in a country where corn sells at from

fifteen to twenty-five cents per bushel, unless so far as it contributes to make out a rotation, and the stalks can serve a valuable purpose for fodder."

Taking the whole State into account, and comparing views with the various amounts in the different counties as given by the census for 1840, we find that, in the counties furnishing the heaviest crops of corn, there has been reported an increase during the past year; so that there has been a general advance, it is believed, of at least 20 per cent. on the whole crop in the State. We are almost inclined to put it at 25 per cent., but prefer to be within bounds.

The results of the corn crop in Indiana appear to be equally favorable. In the northern central section, above the Wabash river, and in the northwestern part of the State, it is believed that there has been "25 per cent. more." In the central part of the State more land was sown, and more industry applied, so that the increase is supposed to be "30 per cent." South from this last, also, there was an advance of "20 per cent.;" while an equal increase must be allowed for the southeastern section. Our informant here adds: "Owing to the drought in the early part of the season, enabling us to get the fields well cleared of weeds, and the rains setting in at least in time to make the crop, in some portions of the State the gain on the crop of 1844 is rated as high as 50 per cent., or more. It will be recollected that the crop of that year fell off very considerably in this State; and, in view of this fact, it may not be too high to estimate the average advance for the whole State, over the year 1844, at 25 per cent.

The early accounts of this crop in Illinois, and indeed its general progress, are most encouraging. A public journal published at Quincy, in this State, under date of May 7th, says: "The corn in this section is mostly planted; and, in some parts of the country, it is in so forward a state that the farmers were engaged last week in ploughing it. The showers of the two weeks past have had a most beneficial effect upon vegetation of all kinds." *June* 23.—We find the following statement in the Prairie Farmer, an agricultural journal of high repute at Chicago. The section embraced in this account comprises eight or nine counties. "The corn, it does one good to look at. For the last eighty miles much of the corn is from four to five feet high; and, had the weather been such that it could have been ploughed, it would now be mostly laid by. As it is, some must yet be ploughed to its injury, as the roots will be cut very considerably. The difference in the appearance of the corn from Cook and Dupage to Sangamon county, is truly wonderful. Without personal observation, one would hardly believe it." In one section, complaint is made of much damage having been suffered from the depredations of birds. Thus, the Ottowa (Ill.) Free Trader says: "The farmers in this vicinity are much troubled with the blackbirds, who visit the cornfields in such numbers as completely to cover whole acres, and destroy every hill of corn within their reach. Several farmers have replanted once or twice, and many at this time are going over their fields and repairing the damages of this troublesome little visiter."

A month later, the Alton Telegraph, speaking of the crop, says: "The corn never looked better, and the weather is very favorable."

In August, also, the condition of the corn crop is represented as being unusually good. We subjoin some of the notices respecting it which we have gathered from different papers:

"A gentleman, who is thoroughly acquainted with Illinois, and has recently

passed through the State, says that the crops of corn throughout are very good. Some of the corn is 18 feet high. Illinois had never before so valuable crops."

Again: The Alton Telegraph says: "We were told, a few days since, by a gentleman fully competent to form a correct opinion upon the subject, that the quantity of standing corn which may be seen from Mound farm, in Jersey county, under twenty miles from this place, cannot amount to less than 500,000 bushels. Nor is this all, or the best. From Mr. A. B. Davidson's residence, on the bluff, on the road from Alton to Edwardsville, and about seven miles from this city, there may be seen, without moving from the same spot, by looking only in two directions, fields of standing corn, the probable yield of which is estimated at 1,500,000 bushels."

The estimates made since the crop was gathered are similar. In the section of the State ranging along the west side of the Illinois to the Mississippi river, being the central tier of counties, it is judged to have been "50 per cent. more." In the central west, "one-third better" than in the preceding year. In other portions of the State, from "25 to 30 per cent. advance." This crop fell off largely the previous year. There has been a large quantity of public land sold here within the last eighteen months; and, on all accounts, we think we shall not overgo, if we fix the advance at 30 per cent. over the crop of that year.

From what we can gather of the corn crop of Missouri, we believe that it has been very good. Some mention is made, indeed, in the St. Louis New Era of May 21, of a severe frost a few days before, which nipped the corn in many places; but, as we advance towards the harvest, we find that the accounts are encouraging. Thus the Fulton Telegraph, in July, says: "The corn crop is unusually promising." The St. Louis Republican, also, during the same month, states that "the corn crop never looked better or more promising." A letter, also, in the New York Farmer, dated Gallatin, July 6, says: "The corn presents a splendid appearance;" "never more promising." So the Expositor, published at Independence, in September, says: "The crops of corn with us this year are most encouraging, and of the utmost abundance." We believe, therefore, in the absence of other sources of information, that the crop of corn in Missouri has been much superior to that of the preceding year—probably 25 to 30 per cent. better.

The editor of the Michigan Farmer estimates the corn crop for that State at "10 per cent. better" than in the year before. Such is, also, the view taken of the central eastern section, from Macomb to Huron county. It is said to have "suffered by the drought, but still exceeded the crop of the previous year." In the southwest, and along Lake Michigan, from the south to the centre, west, it is stated to have been "50 per cent. better." The extreme wet weather of 1844 is said to have injured the corn crop of that year, and this cause has not been felt during the past season. In the southeastern part of the State it is said that there is probably "three times" as much raised as in 1844. We believe, however, that, taking the whole State through, we may fix the advance at about "15 to 20 per cent."

In Wisconsin, also, and Iowa, there appears to have been a large corn crop. The Racine Advertiser, in July, says: "Corn, likewise, bids fair to be an average crop; the slight rains and warm weather for a week or two past having enabled it to recover from the blighting effects of the cold and dry weather of May and the beginning of June." The following statement respecting a fine crop in this Territory appeared in a public journal:

"In Columbus, Portage county, Wisconsin, S. W. St. John raised 192½ bushels of Dutton (12-rowed) corn to the acre. Some of the ears were over 13 inches long, and weighed 15 ounces." A writer in the Chillicothe Advertiser, speaking of northern Iowa, says: "It is fair to say that the cultivators of the soil in northern Iowa can raise corn that will average 50 bushels per acre; and it is certain that the corn crop here is a sure one." Compared with the crop of 1844, it is believed that there has been a large increase, as the season was favorable, and the increase of farming population has been very great.

From our preceding investigations it will be seen, that, while in some of the middle and southern States the corn crop has fallen off, yet, in the northeastern, southwestern, western, and northwestern sections of the country, there has been an advance, and the whole aggregate crop of corn for the United States amounts to nearly 417,900,000 bushels; which is about 2 per cent. less, compared with the previous year. We add here, also, several notices, which we have collected, relating to some large yields of corn in different States. More may be found in the appendix No. 3, where is given also a variety of interesting extracts from agricultural papers, &c., relating to modes of cultivation, &c. "The Chemung County (New York) Agricultural Society recently held its annual fair, the proceedings of which were very interesting. From the report of the grain committee, we learn that 5 specimens of corn were exhibited, all of good quality, averaging from 107½ to 123½ bushels per acre; of which, Wm. Hoffman, of Elmira, raised 123 bushels per acre; Josiah Townsend, of Southport, raised 121¼ bushels per acre; Nile Wynkoop, of Chemung, raised 113¾ bushels per acre; Samuel Leverich, of Southport, raised 107½ bushels per acre; John L. Smith raised 119½ bushels per acre." "An ear of corn, measuring sixteen inches long and seven inches in circumference, has been presented to the editor of the New Orleans Picayune. It was grown at Tiapa, in the southwest corner of the State of Tobasco, in Mexico."

"*Giant corn.*—Mr. William Crispin, of Marlborough farm, Great Timber creek, New Jersey, yesterday brought to this office some stalks of corn more than six inches in circumference, and 13 feet 9 inches in height. The reader may well manifest surprise, but the statement is nevertheless strictly true. Such immense stalks we never saw before. They excited no little attention, and were examined during the day by hundreds. Mr. Crispin informs us that the only manure used was about 80 bushels of stone lime to the acre. He thinks that if the crop had been intentionally arranged for 'a long crop,' and planted at certain distances, the produce would have been over 300 bushels to the acre. Surely, the worthy farmer alluded to deserves the premium for corn. We may confidently challenge the production of anything superior."—*Philadelphia paper.*

A new variety of corn is mentioned thus in the American Agriculturist: "*Peruvian corn.*—Edwin Bartlett, esq., of this city, has kindly given us five barrels of Peruvian corn, recently sent him from that country. It has the largest sized grains of any we ever saw before, and is quite a curiosity. There are two kinds—one called by the Peruvians *maiz blanco*, (white corn.) This is the Chancay corn, used for fattening pigs. It is a coarse, inferior article, but grows very rank and strong. The other kind, *maiz amarillo*, (yellow corn,) from Huacho, is large and fine, and is said to make the sweetest kind of bread. Mr. Bartlett informs us it is a great yielder. Any one wishing a quart or two of this corn for experiment can have the

same gratis by calling at our warehouse, No. 187, Water street. We are of opinion it will do best south of the Potomac, as it is a southern corn."

Large yield of corn.—The Highland (North Carolina) Messenger says: "We are informed by Mr. Alexander Porter, the manager of the farm of Thomas T. Patton, esq., that an acre of corn was planted on the farm the last season, with which it was designed to contend for the prize offered by the Buncombe county Agricultural Society, and that a few days since the corn was gathered and measured, and the yield was 113½ bushels! His farm is on Swannano river. Here, farmers, is an evidence of what can be done. Had the season been good, Mr. Porter has no doubt that the yield would have been 150 bushels."

The following statements respecting steeps for *corn* refer, respectively, the first to experiments made in North Carolina, and the last to others made in New Jersey:

"*An excellent mixture for corn.*—Lime, plaster, ashes, salt—equal quantities, well mixed. Prepare the ground well for planting—put a handful in each hill—drop the corn on the top of it, and then cover it with earth. It is good against the grub, preserves moisture, affords nourishment to the plant, attracts carbonic acid gas, and stimulates the soil."

"*Steeping corn, and compost.*—I observe that some of the farmers in this delightful section of country are trying many of the improvements of the age. A Mr. Webbe says he has tried steeping his corn and other grain in a solution of ammonia, and found much benefit from it. Last year, that grown from corn thus steeped was in harvest much sooner, and had larger ears than that planted dry in the same field. He also made a compost or mixture of one bushel salt, one bushel lime, one bushel plaster, and one bushel ashes, and put half a gill in each hill at the time of planting. This produced nearly one-third more corn than that alongside, planted dry, without any of the mixture. Otherwise, the land was manured alike."

The practice of smoking seed-corn has also been warmly recommended as a preventive against the depredations of birds, mice, &c. In a number of the Prairie Farmer, we find the following recipe given for this purpose: "Leave a few husks on the seed-ears, so that they can be hung up in the smoke-house and smoked with the hams; or hang them up in any dry place; and before planting dip the end of a stick in tar, set fire to it, and, holding it under the ears, give them a thorough smoking. I have tried this for three years, and have saved many times my subscription to the paper by it."

"*Large yield of corn.*—Lawton Turner, of Portsmouth, R. I., gathered, the present autumn, from a field measuring 8 acres 18½ rods, which he planted on the farm improved by Thomas R. Hazard, in said town, the following crop, viz:

593	bushels of shelled corn, worth (say) 80 cents per bushel -	$474 40
50	bushels ears of refuse corn, worth 15 cents per bushel -	7 50
20	tons of stalks and fodder, at $4 50 per ton - -	90 00
3	large ox-cart loads of Swede turnips, 150 bushels, at 12½ cts.	18 75
5	large ox-wagon loads of sweet pumpkins, at $3 per load -	15 00
	Total - - - - - -	$605 65

"The field averaging 73 bushels 2½ quarts per acre of sound corn. One

selected acre, 13⅓ rods by 12 rods, yielded 89 bushels 18½ quarts. The ground had been used as a sheep pasture for the last four years. About 6 acres of it were spread over with coarse barn manure and sea-weed previous to ploughing last spring. About one acre was manured in the hill, and the remainder was not manured at all."—*Herald of the Times.*

In the Southern Cultivator we are furnished with an analysis of the southern corn, by Professor Shepherd, which it may be interesting to quote here, for the benefit of those who may not have seen it. He says: "One hundred parts heated to redness in a crucible, so long as a brightly burning flame was emitted, lost 81.05 parts. The completely charred residuum, on being ignited beneath a muffle, on a platina foil, until all the carbon was consumed, left 0.95 part, or less than one per cent. of an easily flowing clear glass. This ash has the following composition: silica, 38.45; potassa, (with traces of soda) 19.51; phosphate of lime, 17.17; phosphate of magnesia, 13.83; phosphate of potassa, 2.24; carbonate of lime, 2.50; carbonate of magnesia, 2.16; sulphate of lime and sulphate of magnesia, 0.79; silica, (mechanically present,) 1.70; alumina traces, 0; loss, 1.65; total, 100.00. Omitting the silica as an unimportant loss to the soil, and the carbonic acid, which is a product of the analysis, we have, in every one hundred parts of the ash of the Indian corn, the following important organic constituents: Potassa, 20.87; phosphoric acid, 18.80; lime, 9.72; magnesia, 5.76; total, 55.15. That is to say, for every 1,000 pounds of Indian corn sold from an estate, the land is robbed of 9½ pounds of inorganic matter, whereof about 5½ pounds consist of principles of prime value to any species of crops."

It may sometimes be useful to know how to estimate the amount of corn in grain, contained in a crib or storehouse, while it is still in the ear, and we therefore give a statement relating to this subject, which appeared in an agricultural paper at the south.

"The following rule for ascertaining the quantity of shelled corn in a house of any dimensions is by William Murray, esq., of South Carolina, and was read before the St. John's Collection Agricultural Society, and communicated by them for publication in the Southern Agriculturist:

"*Rule.*—Having previously levelled the corn in the house, so that it will be of equal depth throughout, ascertain the length, breadth, and depth of the bulk; multiply these dimensions together, and their product by 4; then cut off one figure from the right of this last product. This will give you so many bushels and a decimal of a bushel of shelled corn. If it be required to find the quantity of eared corn, substitute 8 for 4, and cut off one figure as before.

"*Example:* In a bulk of corn in the ear, 12 feet long, 11 feet broad, and 6 feet deep, there will be 316 bushels and $\frac{8}{10}$ths of a bushel of shelled corn, or 633 bushels and $\frac{6}{10}$ths of ear corn; as, $12 \times 11 = 132 \times 6 = 792 \times 4 = 316.8$; or, $12 \times 11 = 132 \times 6 = 792 \times 8 = 633.6$. The decimal 4 is used when the object is to find the quantity of shelled corn, because that decimal is one-half the decimal 8, and it requires 2 bushels of ear corn to make one bushel of shelled corn. In using these rules, half a bushel may be added for every hundred; that amount of ears results from the substitution of the decimals. The term "barrel of corn," so much used by southerners, means 5 bushels of shelled corn."

An experiment is related by Mr. B. P. Johnson, of Rome, in one of the numbers of the Cultivator, respecting the prevention of injury to the crop

from worms. He states that on ploughing up some sward land for corn in the spring, he found under the sod a great number of worms. Fearful lest his crop would be seriously damaged after it was ploughed, he sowed broad-cast about 1½ bushel of fine salt to the acre, and then harrowed and rolled the land. His seed he also prepared by soaking it in warm water for about 18 hours. He next dissolved 2 ounces of sal ammonia, and put it in the water, in which about a bushel of seed was prepared. He planted his corn 2 days after the salt had been sown. It germinated very quickly, was remarkably vigorous, and the plants grew luxuriantly. Not a single hill was found to be injured by the worms, though multitudes were in the ground; while a neighbor who had an adjoining field, and who planted his seed as usual, lost at least one-third of his crop by worms.

Respecting *steeps* for Indian corn, the editor of the Cultivator remarks: "He prefers muriate of ammonia, which he would use by dissolving in water, enough fairly to cover the seed, which may remain in solution 24 hours at a temperature of 60° to 70°. An ounce of ammonia, at an expense of about 2 cents," he says, "is sufficent for 1 quart of corn."

Dr. Webber, of Charlestown, N. H., according to the New England Farmer, dissolved a small piece of muriate of ammonia, 4 or 5 grains, in half a coffee cup of water, and threw into the solution a handful of corn, which he allowed to remain 4 or 5 hours, and then planted it. He planted side by side other corn, not soaked, with that which he had thus prepared, and the soaked corn produced much the largest yield—generally one-third more. The land is stated to have been light and dry; and, for several of the experiments, the poorest spots were selected on purpose. The corn suffered from drought, but in all cases the soaked corn was decidedly the best.

Others, however, have made trial of steeps to no advantage, as appears by the following:

In a communication in the New England Farmer, an account is given of some experiments in soaking seeds in a composition of nitrate, sulphate, and muriate of ammonia, and nitrate of soda and potash, and which, when applied to corn, does not seem to have been equally successful. When steeped 100 hours the corn vegetated poorly, but when steeped 140 hours it lost its power of vegetation. After various trials, 80 hours was fixed on as the proper time, and three rows of steeped corn, and three rows not steeped, were planted through a large field. But the corn that had been steeped, if anything, appeared to flourish less than that which had not been steeped. A few single isolated experiments are not sufficient to determine such a question.

In an experiment mentioned in an agricultural paper, it is stated that seed corn taken from the tip kernels of the ear produced only half as much as kernels taken from the middle of the ear, while those from the butts of the ear gave about fifteen-sixteenths as much as those from the middle. A number of interesting papers on the culture of Indian corn will be found in the appendix No. 3. The method of raising "a sod crop" of corn on the prairies, contained in Mr. Ellsworth's account of prairie cultivation, (appendix No. 1,) is one which will interest many of our western agriculturists, and may perhaps be tried with success on some of the rich level lands in other sections of the country. The experiments of Messrs. Geddes, Young, Underhill, Darling, and others, mentioned in appendix No. 3, deserve the attention of the planters and farmers of our country.

The new variety of sweet corn for the table, obtained by Mr. Darling,

will be valuable to gardeners, &c., who furnish the markets of our large cities.

The importance of subsoil ploughing for this crop is evidenced in the following extract, which we give from the American Agriculturist of November last:

"A farmer from Connecticut informs us that he has raised a field of corn during the past summer which he thinks will average 80 bushels to the acre, and that he selected half an acre of the best, from which he gathered 134 bushels of ears, all sound and well filled out; that while his neighbor's corn adjoining was withering with the drought, his was luxuriant; and he attributes the whole of his success to subsoil ploughing. Another important fact stated by him was that the whole expense of planting, cultivating, and harvesting, after the ground was ploughed, did not exceed $3 per acre; that he did not touch it with a hoe, but worked it with a harrow and cultivator, and those few weeds that were not reached with these about the hills were pulled up by hand before going to seed."

In the March number of the Cultivator (1845) is given an account of an experiment made by Mr. Charles Colfelt, of Pennsylvania, in 1844, who, by the use of a peculiar compost of his own preparing, secured a large crop of corn. He states that he took 25 bushels of leached ashes, 10 bushels of plaster of Paris, 16 bushels of lime, and about 50 bushels of fine sheep manure, mixed the whole together on the barn floor, and dissolved the lime with beef and pork brine. After thoroughly mixing the compost, the heap looked like gray plaster. He then put one handful of this preparation in a hill of corn, until he found he had not enough to go over his whole 12 acres. He then reduced the quantity to one handful for two, and even three hills. His field was the poorest on the place, and he was told not to expect over half a crop of corn. It had been in wheat, and laid out one summer without clover; so that the prospect was not very encouraging. He adds, that some of his neighbors rather quizzed him about his compost, but were amazed when husking and hauling-in time came. The corn grew surprisingly. It was very tall; and although he says the cut worm and blackbirds worked on it to such a degree that he had to plant one-third of the field over again before the 20th of May, yet the crop was as good as any in the neighborhood, if not better. He gathered 26 wagon loads of 70 bushels each; being 1,820 bushels, or 151 bushels to an acre. Some of the ears he states were so high that a man six feet tall could not reach the top of the ears of corn. The kind of corn planted was the large and small yellow, and was all hard. Where the handful of compost was put was the best corn; and, as the quantity was diminished, the difference was readily perceptible in its appearance.

The Farmers' Cabinet of June, 1845, contains a letter from Henry Cazier, of Newcastle, Delaware, which recommends ploughing in September for corn. He states that it is a remedy for preventing the worm from destroying the young corn. His statement is as follows: "In this county the heart-worm and the wire-worm have made great destruction in the corn for the last ten years. I have accidentally found out a remedy that has twice succeeded in preventing the worm from destroying the young corn. In September, 1842, I ploughed a part of a clover sod for wheat, but the great drought prevented my finishing the field, so that I concluded to put the clover sod field in corn in the spring of 1843; the part ploughed in

September, 1842, escaped the ravages of the worm, while the land alongside, ploughed in the spring of 1843, was nearly all taken by the worm; this induced me to try again, which I did in the month of September, 1843, with the same success as before stated. To plough in November or December will not, as I believe, be of any use whatever as a preventive against the worm. I have known a field part ploughed in September, part in December, and the residue in March following, with the following results: The first escaped the ravages of the worm; the second and last were both destroyed in greater or less degree—all in the same field. Now, it is worth a fair trial; and, if September ploughing will prevent the destroyer, it will save the farmer much trouble and loss. It has succeeded in three instances, to my knowledge. The reason of which success, I leave for others better qualified to ascertain. The facts are worth attending to, as it may save many bushels of corn to the farmer. * * * * The foregoing observations remind the editor of a fact which occurred some eight or ten years ago. He ploughed about one-third of a field of fourteen acres for corn, very late in the autumn; the plough was then stopped by the frost, but the weather being remarkably mild for a few days in the second month, the plough was again started, and some four or five acres more were ploughed, when the cold weather again suspended operations. The remainder of the lot was not finished till the latter part of the fourth month, just before planting time. One-half of the field was limed with thirty-five bushels to the acre; the other half had no manure. The *cut-worm* was exceedingly troublesome all over the field. There was no perceptible difference in its ravages, either where the ground had been ploughed at different periods, or where the lime had or had not been applied. The corn was replanted and replanted."

An experiment in the culture of Indian corn was made by Judge Clark, of Waterloo, New York, in which a large crop (140 bushels of sound corn to the acre) was raised on a peaty swamp. The writer, who furnishes the account to an agricultural paper, says that the farmers predicted, that if the season should be wet the crop would be drowned; if dry, the muck would dry up and the corn wither. He says, however, that on going over the field one morning early, after the second hoeing, and the ears had commenced forming, in the height of the drought of last summer, instead of finding the soil dry and thirsty, the whole loose peaty mass was full of moisture. He attributes it to the hydrogen of the decomposed mass during night having united with the oxygen of the air, and thus having formed water, as well by capillary attraction as by chemical affinity. In a less porous soil, the union he thinks could not have taken place in the same way. If the peaty soil, too, had not been in a fine state of decomposition, the same result would not have occurred. If the season had been wet, the ditches would have prevented the crop from being drowned; but the decomposition not being as rapid for want of the heat of the sun upon it, the crop would probably have been ruined—not from its being overflowed, but as the union of the two gasses above mentioned could not have taken place from want of preparation in the peaty soil to evolve the hydrogen. The experiment is an interesting one, whether or not the theory advanced to account for the success be the correct explanation.

Mr. A. D. Coulter, of Herriotsville, Pa., also communicates to the editor of the same paper for January, 1846, the result of an experiment which he

made last season in drilling Indian corn, by which it would appear that this method deserves more attention than it has received. He made his rows three feet apart—put two grains fifteen inches apart in the row. On three acres he raised 369 bushels of ears. Some of his neighbors prophesied a failure, but were much astonished to find the result so entirely different from what they had expected.

Corn and potatoes in alternate rows are said, by a correspondent of an agricultural paper, to produce as much corn as if every row was corn, and half as many potatoes.

The *level* cultivation of corn is recommended in an essay on the cultivation of this product, read before the Agricultural Society of Fayette county, by Mr. John Wray, and published in the Somerville Reporter, Tennessee. He commenced this method of cultivation about twenty-five years since; and as he has found it to answer well, he still continues the practice. He uses no plough, but simply works his ground over with what he calls a *rake*, which mellows the soil and cleans the surface. He ploughs his land in October and November six to eight inches deep, and buries all the vegetation, and plants his corn from the 10th to the 25th of March; laying off the rows $4\frac{1}{2}$ feet each way, and leaves three stalks to each hill. He thinks the reason why some farmers do not succeed in the use of the rake, is because they do not plough their land, but only scratch it over at first, and the grass is not killed in its germ; but they do not use the rake till the land is overgrown, and then abuse the rake because it will not do all that was promised. This method of cultivation, as is obvious, can only answer in light, warm, and mellow soils. The editor of the Cultivator recommends the use of a light, narrow shovel plough, and in some soils a harrow will be found sufficient.

The cultivation of Indian corn for fodder, while green, has been alluded to and recommended in former reports. Some examples have been heretofore given of great productiveness obtained by sowing broadcast. The attention of many of our agriculturists seems to have been recently turned to this subject.

In appendix No. 3, we have quoted from the New England Farmer the statement of Captain George Randall, of New Bedford, Mass. It will be seen that he estimates the corn fodder taken from 2 $\frac{32}{160}$th acres equal to fifteen tons of the very best English hay. On the amount thus obtained he fed *twenty cows in milk, or in calf dry*, one heifer over two years old, two stock bulls grown, and five spring calves, for seven weeks and five days. This he states was all the green fodder his stock had, except what they could pick up from a pasture, burned up, in which they had run during the season. In five days after feeding on corn fodder, he says his cows increased their milk one can full, or ten quarts. We have ourselves had the pleasure of hearing from Captain Randall, in person, the confirmation of his whole statement as published, and his full confidence in the value of the green corn crop as fodder for stock of all kinds.

Another statement which is given in an agricultural paper mentions the planting of an acre of corn for fodder eighteen inches apart one way, twelve the other, and three kernels to the hill. The product was five tons of well cured stalks and fifty-four bushels of corn; the land was never manured; it was a clay loam, interspersed with granitic boulders, and quartz, and limestone. The estimate of expenses as given is as follows:

5 tons of stalk, worth this year $7 per ton - - - -	$35 00
54 bushels of ears of eight-rowed corn, at 25 cents - -	13 50
Total -	48 50
Deduct the cost—	
1 bushel of seed; planting, hoeing, cutting up, husking, stacking stalks, and use of land - - - - -	17 44
Net profit -	$31 06

The subject of *corn-stalk sugar* will be considered when we come to speak of the sugar crop.

The cultivation of *broom corn* has been mentioned in some former reports, and the use of the seed for feeding sheep spoken of. Confirmatory of this, we here subjoin a few remarks from the Massachusetts Ploughman: "The seed is excellent to fatten sheep. Albert Hibbard, of North Haddam, tells us that he makes use of the seed of his broom corn to fatten sheep; that they are very fond of it, and will fatten better on this than on Indian corn. Broom-corn is raised in great quantities in the river towns, where the brooms are made up and distributed to all parts of the country. We have often raised the corn for the sake of the brush; but we have never made much account of the seed, though we think it has seldom been converted into meal for hogs. Mr. Hibbard thinks the broom-corn seed more valuable for sheep than oats, or any grain, pound for pound." A correspondent of the Cultivator for November, 1845, in reply to a request for information on the culture of this plant, gives the following directions, which, we presume, will be acceptable to many farmers; as more attention has lately been turned to this subject in some parts of the country. "I am not prepared to give satisfactory answers to your correspondent on the subject of broom-corn, in every particular, but will briefly state that we have, the past summer, had about 35 acres under cultivation—about one-half on the Mohawk lowlands, (or flats,) which is the soil generally preferred; the balance adjoining, on a gravelly soil. On account of the extreme drought, the low ground has done much the best. 2d. *As to profits*, compared with other crops, much depends on the success you may have. Some seasons it does much better than others; the past has been too dry to give a good large brush; but with us the seed has been an extraordinary crop, averaging nearly or quite 50 bushels to the acre, and most of it very full and heavy, weighing 31 pounds to the bushel, and is excellent for fattening hogs. They eat it greedily, and thrive on it as well, if not better, than on Indian corn. An acre of good broom-corn should yield from 400 to 600 pounds of brush; and the seed, when good, is worth in its rough state as much as oats for feed. I have now on hand enough of prime seed to plant 200 acres, and can supply your correspondent with any reasonable quantity at the lowest market price. My seed is the largest and best I have ever seen. A letter directed 'J. D. F. West, Schuyler, New York,' will be attended to. As to the query 'Will the increased production be likely to overstock the market?' Like every other product of the soil, there may be an overstock some years more than others, but thus far the demand has kept up with the product."

To show the increasing value of this culture, we also subjoin a short article, taken from the Ohio Cultivator, and another from the St. Louis New

Era: "In confirmation of what was stated under this head, in the Cultivator of May 1, we find the following in the Marietta Intelligencer respecting the extent of the business in the Muskingum valley: 'Last year L. and S. Temple, of this place, commenced in a small way, for the purpose of testing the feasability of the enterprise, the manufacture of corn brooms. They obtained the planting of a little more than 100 acres of broom-corn; and, as the season was favorable, obtained a good crop, which they worked into brooms and broom-brushes here. They gave constant employment to 10 or 12 hands, and, in the course of last season, made 50,600 brooms and 4,000 brushes. This year they have contracted for the planting of 400 acres of broom-corn. Mr. L. Temple is also purchasing, and will pay good prices for, broom-corn to export. We are glad to notice all enterprises of this kind, and most heartily wish all engaged in them the success they deserve. Morgan county, we are happy to know, is doing a good business in broom-corn—for export, we believe. Mr. Asahel Pomeroy, of Windsor, in that county, has 300 acres planted, and is contracting for corn planted by others.'"

In the Ohio Cultivator of May 12, 1845, we find the following:

"*Broom-corn culture in Ohio.*—This article is becoming quite a staple product of the rich bottom lands of this State. From present appearances, it is likely that not only all Yankeedom, but England also, and perhaps the 'Celestials,' will soon be supplied with those important implements of household economy, brooms, from the Buckeye State.

"The most extensive operators in this new business are three brothers, named Eaton—young men of great enterprise and intelligence—natives of this State, and possessing all the necessary qualifications of genuine Yankees. One of them now resides in the 'great metropolis' of England, where he has established an extensive manufactory of brooms, the materials for which are all sent over from this country; and, in an unmanufactured state, are admitted free of duty. The demand there is almost unlimited, so that it is anticipated a very extensive and profitable business will be done. Another of the brothers resides near this city, (Columbus,) and is now engaged in putting in five or six hundred acres of the rich Scioto valley land, (belonging to the Messrs. Sullivant,) which is spread out several miles in width, in full view from the window by which we are writing. He raised about three hundred acres on a portion of the same land last year. The other brother resides at Circleville, twenty-five miles further down the Scioto valley, and is there putting in four or five hundred acres more; besides which, they have numerous contracts with farmers for smaller lots, to be grown for them, and delivered at their presses when harvested. All this is intended for shipment to the brother in England, next fall.

"In addition to all this, we learn that there is as much more land devoted to this crop in the valleys of the Muskingum and the two Miamis, the product of which is mainly designed for the New York and New England markets. We shall, on other occasions, give particular accounts of the culture and profitableness of this product, and the success of the foreign branch of this novel enterprise."

Brooms.—The Northampton Courier states that "Mr. J. D. Brown, of Hatfield, has *sixty acres* of broom corn under a high state of cultivation, at Fredericksburg, Virginia. It is now being cut, and the brush is to be manufactured into brooms by him, at Baltimore."

Again—

"For the Farmer and Mechanic.

"*Schenectady, August* 28, 1845.—The farmers in this vicinity are cutting their broom-corn. They scrape the seeds off while it is green, and then dry it under sheds or in kilns. The seed is lost, but the brush is enough better to pay the loss of that. One gentleman told me to-day that he had one hundred and thirty acres in broom corn; and another, near by, has two hundred acres, and it never looked better. A pound of broom-corn is worth as much as a pound of pork in Ohio. A little west of this, I see farmers are getting in their fall crops in true New England style; plough the ground well, and put a moderate quantity of fine manure or compost upon the furrows, and then drag it in with a sharp harrow, before putting in the seed. In this way you are more sure of a good grass crop to fallow the grain. The ground is left more open, and the roots take a deeper hold, and of course last longer. Yours, E. P. W."

"*A new article of trade.*—We noticed landing 25 neatly packed bales of broom corn tassels, grown up the Mississippi river, and a portion of a crop which will amount to over 100 bales. The 25 shipped here have been sold in New York, to arrive at five cents a pound. If sales can be effected at this rate, we should think it to be a profitable crop, as the culture is very simple, and requires but little outlay either of capital or labor."—*St. Louis New Era.*

The Cultivator for January, 1846, states that "the fine interval lands of the Messrs. Sullivant, near Columbus, have, as usual, been covered with corn this season, on 400 acres of which has been grown broom-corn, by Mr. Eaton, of Chillicothe, who has also, this season, grown the same crop near Circleville and Chillicothe; in all to the amount of 1,000 acres, which has been very nicely prepared, put in bales, and pressed, and has already gone forward to be shipped to England, where the owner has workmen employed in manufacturing it into brooms."

Another application of broom-corn is suggested, in an extract which we present, taken from some public journal. Should this prove successful, it might render this product one of still greater value to the agriculturist:

"A specimen of paper made from broom-corn stalks has been shown in Philadelphia. The Philadelphia Inquirer alludes to it as an excellent article, remarkable for toughness, flexibility, and body; and (another important matter) offered at a very low rate. The manufacturers deserve credit for their enterprise."

POTATOES.

The potato crop of the last season has again been subjected to the same disease which so greatly lessened it in the previous year. To whatever cause it is to be attributed, yet the extent of its influence has been greater, for it has made its appearance in sections of the country which had been before free from the same. The precautions suggested in the former year may have aided in checking the evil to some degree; but the whole amount of decrease is fearfully enlarged in those regions generally affected heretofore.

The New England States have again been among the principal sufferers. The accounts from first to last, since the period of its development, have been more unfavorable in Maine. The public journals and agricultural papers have been uniform in declaring that there has not been more than

half a crop. From the fact that an extension of the starch factories created a greater demand for potatoes, there have been many more planted; but a great many have been destroyed, either in the ground or after they were gathered and stored. Thus the Augusta Age, in the centre of the State, in September, says: "We regret very much to learn, from all parts of the country, that the potato crop is almost entirely destroyed. In a recent trip in Lincoln county, we were informed by many of the farmers that they should be hardly able to obtain enough potatoes in a sound and healthy state to replace the seed of last spring. The vines or tops died some weeks ago, and, on digging, the potatoes are found to be very small in size and few in number; and what is still worse, those that are found prove to be much diseased, and soon rot and become unfit for use. The result must be that this State, from which an immense amount of the first quality of potatoes have heretofore been annually exported, will hardly produce enough for the consumption of its own citizens." Again: "The Eastport Sentinel states that it has been estimated that there were shipped from that port last season 19,620 barrels of white blue nose potatoes, and that the quantity shipped direct from Calais, Robbinston, Perry, Lubec, and Pembroke, would make the number of barrels exported rising 40,000. It is now supposed that the quantity to be sent to market will not exceed 5,000 barrels, as very few farmers in the neighborhood will have more than will answer for seed and their own consumption." So, in October—"We are sorry to state that the failure of the potato crop in this vicinity is much more extensive than last year. Many fields do not yield the quantity planted, and almost all are more or less affected. From present appearances, there will not be half of an average yield; certainly not, unless the process of decomposition is soon stopped, which may be the case by cold weather. The fall season has been unusually mild—no severe frost until within the last week."—*Calais* (*Me.*) *Frontier Journal.*

Another paper says: "From last year's crop, it is estimated that the loss by rot this year, in Maine, cannot be less than $1,230,000, or more than two dollars to every person in the State." By some we are informed that there was not "one fourth" as large a crop as in 1844. In many sections they failed entirely; in others, the quantity raised was not over what was planted. As the prevalence of the cause was so universal in the State, we think that we shall not be far out of the way in fixing the decrease at an average of 30 per cent.

In New Hampshire, in the southeastern and eastern sections of the State, the injury was probably as much as "20 to 25 per cent.," as compared with the crop of the previous year. A correspondent writes from this part of the State, that "the crop was much injured by the rot, which has caused much fear as to increasing the crop; it has generally been the case that potatoes were grown where corn would not succeed, and the quantity raised has been on the increase; but of late, the people have come to a pause on the propriety of increasing the crop." On the Connecticut river, in the southwestern section, it is said to have been, on the whole, a fair crop. "Many fears have been entertained for the potato crop on account of the drought, and the rot which prevailed so extensively last year. Happily, these fears have been realized in neither respect." If we compare the state of the crop with the census in 1840, we find that there has been considerable falling off in portions of the State which are extensively engaged in

raising potatoes, so that the average decrease for the whole State cannot have been less than from 15 to 20 per cent.

In Vermont, from every section we hear the same complaint. Thus, it is said: "We are sorry to state that the failure of the potato crop in this vicinity is much more extensive than last year. Many fields do not yield the quantity planted, and almost all are more or less affected. From present appearances there will not be half of an average yield; certainly not, unless the process of decomposition is soon stopped, which may be the case by cold weather. The fall season has been unusually mild—no severe frost until within the last week."—*St. Alban's Messenger.*

Lower down, and in the northeastern section of the State, we are informed, that owing to the rot the crop has fallen off at least "25 per cent." The same, but to a less extent, was the case in the southwestern portion of the State, the potatoes having suffered much from the rot since they were harvested. The whole decrease may have been from 15 to 20 per cent.

The disease very much injured the potato crop in Massachusetts. In the northeastern section of this State, a good judge on the subject says that a large portion of them were diseased, and thinks that they fell off "40 per cent." Lower down, in the central eastern section, the decrease is estimated at from "25 to 30 per cent." In the interior we are told that the disease was thought to be less fatal than last year at the time of the harvest; but since then, they have shown more general disease than last year. In the western part of the State the crop is considered "one third less" than that of the previous year. Our informant here adds: "The yield of the potato crop was full an average, and the cause of the diminution in quantity was in consequence of the farmers not planting as many as usual. The disease among the potatoes called the rot was very fatal to the crop last season. They were affected by the same disease this year. It did not commence so early this season as the last, but its ravages are still going on in our cellars. Last season, after cold weather, there was not much complaint." The whole diminution of the crop cannot be less than 25 per cent. as to valuable product, though the number raised may, in sections, have been actually more. There was, likewise, from the drought and rot, a decrease in Rhode Island and Connecticut of not less than 15 or 20 per cent.

The accounts from the various parts of the State of New York represent the potato crop as suffering from the drought early in the season, and subsequently from the rot. Thus, in June, a Batavia paper says: "Early potatoes are used up; but, in consequence of the frequent showers with which we have been recently visited, late potatoes will probably be sufficiently abundant." In August, however, we are informed respecting the crop in the western part of the State—"The potato vines give evidence of the work of the worms, or the disease that was so destructive last year." In the vicinity of New York, in July, it is said: "The early planting has turned out better than was expected; but fears are entertained for the fall crop. Since the seed was put in the ground in June, the drought has been unparalleled. Unless we have speedy rains, we shall have even a greater failure than last year." In August, from the same authority, we learn that "potatoes are nearly ruined. They have revived, but still the appearance is unfavorable, though there is time for improvement." The crop in that region turned out better than in the preceding year; but, owing to the rot afterwards, it decreased from "10 to 20 per cent." Further up the river, the rot also lessened the number gathered. In Albany county the loss was

from "15 to 20 per cent." The same was the case proceeding to the northern sections of the State. In Rensselaer county and vicinity, the crop is thought to have fallen off "25 per cent." The same in Washington and Essex counties. The following is from the county of Washington: "The potato crop has suffered by the rot, which has really become fearful. Every farmer, almost, has been obliged to take them from the ground when buried, and it is probably below the truth to say that fully one-third of the entire crop is lost, and the remainder greatly injured. In Jefferson county, also, the drought is thought to have reduced the amount gathered "30 per cent." In the Mohawk valley, the decrease is estimated to have been still greater. Southeast of this, however, we are told in Otsego county "the crop of potatoes is far better, for the reason that the disease which seriously affected them last year has not made its appearance this year." A similar account is given respecting Schoharie county: "The crop of potatoes is probably double in value that of last year, for the reason that the disease which was so ruinous to potatoes last year has not affected that vegetable much, if any, this year. It is supposed to be "25 per cent. better." Further west, also, the crop was good. This was the case, we are told, in Oneida, Madison, and Oswego counties—"15 or 20 per cent. better." Less were planted in Onondaga county, and the disease prevailed to a considerable extent. In Cayuga and Cortlandt counties, likewise, the potato crop fell off so much that there was not more than "one-fourth or one-half a crop." In the more southern sections, however, the increase is estimated at from "15 to 25 per cent." This was the case in Yates and Chemung counties; "last year potatoes were very much injured by the rot, but this year very little." A similar increase is supposed to have been the result of this crop in Seneca and Wayne counties. In the western counties, on the lake, however, they probably fell off from "20 to 25 per cent.;" and in the extreme northwestern part of the State the decrease is estimated to have been not less than "one-third or one-half." In the southwestern section the rot was not so destructive—perhaps not more than "10 per cent." Taking the State census return as the basis of calculation, therefore, the falling off in the crop will not appear so great, as it may not exceed 10 per cent. for the whole State. Some of the heaviest potato raising counties did not exhibit so great a decrease as others.

The drought and rot also affected the crop in New Jersey, reducing it in some sections "25 per cent.;" in others, perhaps not quite so much. Altogether, however, it seems to have been a short crop—perhaps 15 or 20 per cent. less.

From every section of Pennsylvania, also, we are informed that there is a falling off of this crop. In the southeastern counties, including Lancaster and Chester counties, and the vicinity of Philadelphia, the decrease is variously estimated at from "15 to 50 per cent." In Bucks county and Lehigh, also, on the east, there was a falling off of perhaps "25 per cent." A larger decrease took place in the counties on the Susquehannah, bordering on Maryland—in some cases, thought to be equal to "50 per cent. less." In the northeastern section of the State there was a decline, but perhaps not exceeding "10 per cent." The same was the case, also, in the northwestern central counties. On the whole, there appears to have been a decrease of 20 to 25 per cent. average for the whole State.

The drought is also the subject of much complaint in Maryland, as affecting the potato crop. In the northeastern section of the State, the falling

off is estimated to have been as much as "50 per cent." The rot is likewise stated to have done much injury in the same section. A portion of the potatoes raised in Maryland are sweet potatoes. So far as we can ascertain, this disease did not affect them. The average decrease may be fairly put at about 20 per cent. for the whole State.

In some parts of Virginia the potato crop was much cut off by the drought. We do not, however, recollect any complaint of the rot; probably because the greater portion of the crop consists of sweet potatoes. In the central region, east of the Blue Ridge, they suffered greatly, and, we are told, were almost an entire failure. The same was the case in the section bordering on the Kanawha and its branches, (western central,) where the loss is believed to have equalled 25 per cent. In the northwestern counties of the State, however, there was a slight increase. The decrease for the whole State is estimated at 20 per cent. Though free from the rot, yet the potato crop of North Carolina fell off largely, varying, in the different sections of the State, from "25 to 30, and even 50 per cent." The drought is assigned as the cause of this loss. In South Carolina, also, the accounts are not less unfavorable; and, in some cases, as in the region of Spartanburg and the adjoining counties or districts, where the drought seems to have been most severe, the decrease is believed to have been "three-fourths" of the whole crop. In others, as in the northwest part of the State, it is fixed at "25 per cent.;" in the northeastern, towards the central, "40 per cent.;" and in the east central, bordering on the coast, about "20 per cent." The decrease may, therefore, have been about 25 per cent. average for the whole State. In Georgia, in the portion of the State lying in the northwest corner, there was as abundant a crop, both of Irish and sweet potatoes, as is usual. In the central, west of the Ocmulgee river, we are informed that there was not "one-fourth of a crop," and the drought affected them seriously in other sections of the State. The decrease was probably about the same as that in South Carolina. The falling off in the central part of Alabama seems to have been nearly "one-half;" while, in some other portions, it was less affected by the drought, and in others even an increased quantity was produced. The whole decrease was probably 10 to 15 per cent. The potato crops of Louisiana, Mississippi, and Arkansas, are but little noticed in the agricultural journals; and our other sources of information are so scanty that we can scarcely venture a conjecture, but probably there should be some allowance made for the drought; yet, even taking this into consideration, we cannot suppose that it varied much from the usual average crop. There was, we believe, a slight increase in Tennessee—in some sections perhaps as high as "10 per cent." Such is the estimate of those who have had an opportunity of judging. In Kentucky, in the northeastern section of the State, and thence towards the centre, there is complaint of the drought, and the decrease is estimated at from "20 to 30 per cent." In the southeastern part of the State, by some there is supposed to have been an increase of "10 per cent.;" while, in the interior of the State, towards the west, it did not differ much from the crop of 1844. Neither of them, however, could be called good crops—perhaps a slight increase.

The early prospects of this crop in Ohio were favorable. They are said to be "good—promise well," &c.

The Milan Tribune in August says: "Apprehensions begin to be felt as to the prospects of the potato crop, especially that part of it on sandy land. We have not made very general inquiry, but what we have made, and per-

sonal examination, convince us that this crop in danger. In examining a dozen hills where the tops seemed most thirsty, we found but one hill in which anything like patatoes was perceptible. Others gave the same report. Rain, and that soon, will be required to save this important vegetable."

In the north and northeast section on the Reserve, from the centre, from drought and disease the crop is thought to have fallen off "30 to 50 per cent." East of the centre, on the Ohio river and Pennsylvania, the decrease did not exceed, it is probable, more than "10 per cent." South of the centre, on the Scioto river, it was about "20 to 30 per cent." The rot was also felt in this section. In the southwest section of the State, on the Miami valley, it fell off, it is said, "25 per cent." West of this there was a slight increase—perhaps "10 per cent." In the central northern sections, including Delaware, Richland, Knox, and Licking counties, &c., it was better in the first named counties—perhaps "20 to 25 per cent." increase; in the latter the gain was not so large, as the rot was somewhat felt. In the northwest corner of the State "10 per cent. more," and about the same east, along the lake, towards the central north section. We believe that, taking the whole State, there was a falling off of perhaps 10 to 15 per cent.

The crop of potatoes appears to have suffered much from the drought in Indiana, and mention is also made of the disease, which does not seem to have prevailed there in 1844. In the north central section, above the Wabash river, and in the northwest part of the State, it is estimated to have been "25 per cent. less." In the central portion of the State a similar conclusion is drawn; while on the west of this it is thought to have fallen off at least "30 per cent." In the southeast section, where the blight is mentioned, there is perhaps a less crop by "20 per cent." Our informant, describing the blight which has affected them, says: "It first affects the vine just above the ground; it turns black and gangrenous, and the whole top dies for want of nourishment from the root. The potatoes are sound and good; but there are few, if any, with us, which have attained their full growth, owing to the death of the vine having occurred before the full growth of the potato could take place. We have not as yet been able to ascertain the cause of the disease which affected the crop on old, new, and manured ground, as well as that which was not." The whole crop of this State must have fallen off from 20 to 25 per cent.

In most parts of Illinois there was a considerable falling off of the potato crop. In the northwest and northeast sections it is variously estimated at from "10 to 25 per cent." In the central, west of the Illinois river, and towards the Mississippi river, it is thought to have been considerably better. Still lower down, towards the southwestern corner of the State, there was a decrease of "25 per cent." On the whole, probably there was an average decrease of from 10 to 15 per cent. for the whole State.

The following, from the Prairie Farmer for November, 1845, shows that the disease has made its appearance there:

"*The potato rot.*—This malady, which has been creating such dismay in the eastern States and over Europe, has made its appearance among us, and its ravages in sections of Will county are described as fearful. Some farmers out of 300 bushels do not harvest ten; and those which were harvested in good order are found in a little time entirely useless. When many decay together, the stench is intolerable."

In Michigan, with the exception of the southeast part of the State, there has been a decrease, varying, as estimated, from "10 to 30 per cent." The

editor of the Michigan Farmer places it at about "one third." On the whole, we believe the average to have been from 10 to 15 per cent. less. The appearance of the *rot* is mentioned by the Niles Republican, which states, "in Berrien and Cass counties hundreds of bushels have been put in the cellar dry and in good order, but have taken the rot, and been completely destroyed."

A writer in the Michigan Farmer, also, under date from Jackson, says: "Michigan has hitherto escaped nearly uninjured, but the present year the disease has prevailed with some virulence in certain neighborhoods in this and one or two adjoining counties. We have not heard of its appearance in other parts of the State."

The whole potato crop of the United States for 1845, including, of course, both common and sweet potatoes, is estimated to have been about 88,392,000 bushels. We have no means of ascertaining how many of these were sweet potatoes, but we presume as many as one sixth or one-seventh, if we may judge from the proportion of the States in which the crop was raised.

The *culture of the potato*, both the sweet and Irish, as it is termed, is an object of much interest to our country, and any suggestions on the subject from those who are well fitted to give them, will also prove of much interest.

In appendix No. 4 will be found several articles of value on these topics: The paper on the culture of the sweet potato, by W. Summer, of Pomaria, S. C., which we have taken from the Cultivator for February, 1845. Another short article, also, is given, which originally appeared in the Vicksburg Constitutionalist; and we have also added Mr. A. Vestal's method, as set forth in his pamphlet.

The following is an analysis of the sweet potato by Professor Shepherd. He says: "The tubers analyzed, though fresh from the market, were obviously drier than when first harvested. 100 parts of the thinly sliced tuber, on being thoroughly dried at a temperature of 200°, lost 58.97 per cent. of water. One hundred parts of the undried potato gave 1.09 parts, or rather over 1 per cent. of a whitish ash, or a bluish green color. Its composition was as follows:

Carbonate of potassa, with traces of soda	60.00
Phosphate of lime	14.57
Phosphate of magnesia	5.60
Carbonate of lime	5.39
Carbonate of magnesia	3.80
Chloride of potassium	4.60
Sulphate of potassa	4.35
Silica	0.70
Chloride of calcium, sulphate of magnesia and lime, alumina, oxides of iron and manganese, in traces, and loss	0.99
Total	100.00

One hundred parts of the ash from the sweet potato tuber contains, then, the following inorganic principles, which must have been withdrawn from the soil, viz:

Potassa	43.59
Phosphoric acid	11.08

Lime	10.12
Magnesia	3.80
Potassium	2.42
Chlorine	2.18
Sulphuric acid	1.90
Total	85.09

The articles on the culture of the common potato, also contained in the appendix No. 4, above mentioned, from the Indiana Farmer and Gardener—the one contained in Mr. Girdwood's letter to the Cultivator, and found in that periodical for October, 1845, on the potato culture in Scotland—and Colonel Clark's letter, &c. will amply repay the time and trouble of a perusal. We add here two short extracts from different agricultural papers on the same general subject:

"I noticed a method of cultivating potatoes which struck me as very good, especially on old ground. First, furrow the field both ways, and then plant in the check or cross of the two furrows; cover them lightly, yet deep enough to have them vegetate quick. As soon as the sprouts begin to crack the ground, go into the field, and from the cart put a shovelful of coarse or green manure on top of the hill; then plough between, turning the furrows together, and covering the manure. Always follow with a hoe, and see that the manure is well covered. As the rows run both ways, when it is time to hoe, plough contrary from the first time, and very little labor is required to hill sufficiently and keep the weeds down. The manure is as safe in this manner as it is heaped up in the yard or field to wait the fall crop. It is not exposed to the sun, nor is it as likely to heat and throw off the ammonia, and other properties essential to vegetation, as it would be in larger quantities or heaps. In digging the potatoes, and ploughing again for the grain crop, the manure is completely mixed with the earth. I go heart and hand for putting all manure into the earth as soon as it can be got from the farm, whether coarse or fine, especially in the spring of the year, instead of heaping it up to rot and waste through the summer. Mr. Demarest says he gets nearly double the quantity of potatoes from this method, to what he would without this manure. Coarse manure helps to keep the earth moist under it. I have seen potatoes vegetate and produce well lying only covered with straw, about six inches, and no earth over them.—E., *Passaic county, New Jersey.*"

"S. Widney, of Piqua, Ohio, informs us that he successfully cultivates potatoes on the following plan: Plant in hills, and when the potatoes are about an inch out of ground, take a light plough and run it so close to them as to cover them lightly with earth. When they get through this an inch or so, cross-plough them, covering up as before. This mode is stated to be equal to the best hoeing, besides being a great saving of labor. Mr. W. states that he has practised this mode for several years, and has never lost a hill, or had them at all injured by covering." Some remarks on this method of Mr. Widney, by Mr. Bickett, may be found in the appendix No. 4.

Mr. T. C. Hines, of Nansemond, Virginia, in the August number of the Cultivator, describes a mode of cultivation there practised, which he thinks may have a tendency to prevent the disease that has proved so destructive; but he does not say whether he is speaking of the common or the sweet po-

tato. He says: "In the selection of our land we prefer a light, sandy soil, without great regard to the richness of quality. This having been well pulverized, is drilled to the depth of from five to six inches, and from 1½ to two feet apart; at the bottom of these furrows, and at the distance of eight inches, are laid the potatoes, which we prefer being cut with from two to three eyes to a piece; the drills are then filled nearly to the top with the best littered stable manure, and a small portion of dirt is thrown on this so as to level the whole. The entire surface of the ground is then covered with leaves (we prefer fine straw) to the depth of from three to six inches. The advantages of the straw are obvious; by the use of it a more uniform moisture is produced, as well as temperature of soil, which is also kept perfectly free from grass and weeds, although no further attention is required, either from the plough or hoe, until the maturity of the potato, which for size and number I have never seen surpassed or equalled by those raised by any other method."

Mr. Robey, of Hopewell, Virginia, says, in the same periodical for September, "that he has been successfully breaking up a piece of sward land in the fall and spring, which he reploughs about the 20th of June. He plants the potatoes in pieces, a foot in the row, the rows four feet apart. When the tops are about six or eight inches high, he runs the plough close to the potatoes and throws the earth away, and then turns the earth immediately back and follows with the hoes. This is all the working they get."

As to planting in hills or drills, we are told, in an agricultural paper, that the Plymouth County Massachusetts Agricultural Society, in 1844, paid premiums to ascertain the best mode, and the following results were obtained:

"P. Bassett, of Bridgewater, raised in hills 363 bushels, in drills 425 bushels, per acre. Paul Hathaway, Middleboro', 331 bushels in hills, 396 bushels in drills, per acre. B. Hobart, 270 bushels in hills, 310 in drills, per acre."

Other statements as to the culture of the potato will be found interspersed also in the articles on *the rot*, in the appendix Nos. 5 and 6.

The question has been discussed in a number of journals, from time to time, respecting the advantage or injury of removing the blossoms from the vine. In the appendix No. 4, we have therefore introduced some articles on this subject; one from the London Gardeners' Chronicle, edited by Professor Lindley, the celebrated botanist; another, alluding to the same, in the Boston Cultivator.

Another question which is still mooted in the discussions of agriculturists is that of cutting or dissecting the potato tuber, or subdividing the plant. We also quote a statement on these subjects from a pamphlet by Robert Arthur. By dormant dissection is meant cutting in the autumn or winter, instead of spring:

"*Experiment on dormant dissection.*—In this experiment the seed was cut in November, and immediately stored in an old stable among peat mould; they were not so much diseased as the whole ones in spring. There were only four of the sets covered with blue mould, the rest being healed over bright and hard, and white. The blue moulded ones did not grow, but all the others grew vigorously, producing much taller plants and larger foliage than the former. The crop was later than by bleeding, dissection, or subdivision, and produced at the rate of 11½ tons per acre of larger and healthier potatoes."

"*Experiment on potato plant subdivision.*—In this experiment the seed

was preserved the common way, removed to a vinery in March, buried among mould, watered abundantly, and, when sprung to 6 or 8 inches, each large potato was subdivided into from 9 to 12 plants, having one rooted stem with a small set to each. These were dipped in puddle, and planted 10 inches apart, at an angle of about 45°, with the tops towards the east. Other experiments, however, suggest that the roots and potatoes should be exposed to the south, (or as near that point as practicable,) with the tops northward. The result of this experiment was, an earlier crop, by about 3 weeks, than by dormant dissection. The tops were regular, but not so vigorous. The potatoes were of very equal size; smaller, but much more numerous, than by either bleeding or dormant dissection. Although, by this subdivision, the peck planted fully double the length of the drill, on equal portions of the ground being cleared, potato plant subdivision yielded fully 13 tons per acre; that is, more than double of bleeding dissection, and 2½ tons more than by dissection."

In the Agricultural Village Gazette of W. Löbe, from which we have already quoted an account of Siberian rye, the *winter culture* of potatoes is recommended by Von Plotho and Franckg. The first, under date of April 1, 1845, says: "In spite of the severe winter, I have, on the 1st November, covered up potatoes with leaves only a foot high, and they have grown admirably, and are perfectly formed." The editor states that the specimen furnished him of these winter potatoes were indeed of so remarkable a kind, that it furnishes a strong recommendation in favor of the winter culture. The other correspondent says, that in the beginning of September, by way of experiment, he laid out a little bed in his garden, and planted half with white potatoes, and half with red ones, and covered them only slightly with earth. "The potatoes throve more rapidly and stronger than in the spring season." His business called him off, so that they were neglected till after a hard frost; in December (7th) the leaves were already nipped and dead. He then covered up the bed with alder leaves, and, by the middle of April, had the satisfaction of eating therefrom fresh good-tasting potatoes. The product of the red was greater than that of the white. He was so well pleased with his experiment, that he intended repeating it on a larger scale.

Speaking of early potatoes, the editor of an agricultural paper in Boston remarks: "A writer in the Maine Cultivator says that he planted the white blue-nose potatoes the last of April, and he had good-sized ripe potatoes on the 14th of July. We have tried many experiments to ascertain what potatoes are the earliest, (selecting seed from different sections,) and we have found the above kind the earliest of all, and, when used early, of the finest quality, being very good and mealy before fully grown. They do not usually grow large, nor yield well; but in the neighborhood of Eastport, Maine, owing to a peculiar soil or high manuring, they attain a good size; and large quantities of them are sold in this market, under the name of 'Eastport potatoes.'"

The use of the potato for *starch* has been steadily advancing in our country for some time; and, we doubt not, will eventually consume a fair proportion of the surplus crop. In one of the public journals we find the following statement, which is encouraging. It is dated some time in August last: "No less than 20 potato-starch factories are in progress of building in the county of Franklin. More than 50 tons of starch were made at the factory of Abiel Abbott, in Farmington, the last winter. A number of

starch factories are going up in the western part of the State."—*Thomaston Recorder.*

A fuller statement is also given in the Maine Farmer: "About 100 rods from the centre of Mercer village are 2 starch factories, located by a small stream, with a dam across it, which affords the necessary power to keep them in motion. One has been in operation but a short time; the other for some 2 or 3 years, we believe. They are doing a good business for the proprietors, and also for the farmers in the vicinity, who find a ready market for their potatoes, which, as a general thing, is as profitable a crop as is cultivated. The walls of these buildings are built of bricks, and the structures themselves are somewhat larger than we had anticipated, being, we should judge, about 50 feet in length, by 35 or 40 in width, and inside 3 stories high. The starch made is of first rate quality. It is principally taken to Massachusetts, where it is readily marketed, and consumed mostly in the calico and cotton factories. We are informed that one of these factories manufactured into starch the past season rising 1,8000 bushels of potatoes, giving employment to 6 or 8 men. During the summer months, after the potatoes are all ground, only 2 hands are required to a factory, they being employed in drying the starch that could not be dried during the spring, and in putting it into casks. The dry-rooms are large, on the 2d floor, and are heated by a huge furnace below. Starch factories are springing up all over the country. Three are under process of erection in Starks, at different points, and will be ready to commence operations the coming fall. There are now being completed, and being erected in Somerset county alone, ten starch factories. These will consume an immense quantity of potatoes; and farmers have made calculations accordingly, and planted largely. We heard one farmer say—who is himself interested in a factory, now in process of erection, either in Starks or Solon, we do not remember which town—that he had planted 15 acres of land in potatoes."

The disastrous results of the potato *blight* in Europe have called out the efforts of the scientific men, both in England and on the continent, to suggest modes of converting this fruit into flour, or farina. In the National Intelligencer, the correspondent from France furnishes the following account of a mode discovered by M. Clerget, and by him laid before the Academy of Sciences at Paris. It is an interesting paper to our farmers at the present time: "*Academy of Sciences, Paris—sitting of October.*—A letter was read from M. Clerget, giving an account of his discovery of the mode of making potato flour, of such a quality as to be in every respect fit for panification. M. Clerget's letter was accompanied with several samples of his productions, in the different stages of the process. Amongst them are two specimens of the flour, of nearly a yellow color, which represent, we are told, the potato in its natural state; divested, however, of the essential oil, and useful for various purposes of domestic economy, although not so fit for panification as the flour obtained in a more advanced stage of the process. There are three samples of pure white flour—one in powder, the other two granulated; in which state the flour will keep good for several years, if kept in a dry place. M. Clerget says that when this flour is mixed with that from wheat, in the proportion of cent. per cent., and made into bread in the ordinary way, it is exceedingly wholesome and nutritious, and cannot by the taste be distinguished from pure wheaten bread. This we can believe, for we have eaten bread made in the same proportions of wheaten flour and potatoes boiled and reduced

to a pulp, and found it even more agreeable than that made from the flour exclusively. Bread thus made, however, is not agreeable when it has been kept two or three days; whereas, according to M. Clerget's statement, that which is made from an admixture of his flour with that of wheat, in equal proportions, is much better, when stale, than pure wheaten bread. He estimates the saving, by means of this mixture, at from forty to fifty per cent.; but this appears to us to be an error, for the potato flour cannot be sold to to the public, with a reasonable profit to the manufacturer, at less than *two sous* per pound. Taking wheaten flour at *four sous*, two pounds of bread made of the mixed flour would cost *six sous* instead of *eight sous*, which certainly does not give a saving of forty to fifty per cent., although it does effect a very important saving. We need not observe that the mixed bread contains less gluten than that of wheat only, but we are by no means sure that an excess of gluten is favorable to nutrition. M. Clerget is of opinion, however, that if gluten be added, which is practicable in various ways, very good bread may be made with two-thirds potato and one-third flour of wheat; and in this case the saving would be enormous. He informs us, also, that if the potato flour made by his process be mixed with the flour of rye, which by itself is difficult of panification and digestion, a very nutritious and agreeable bread is made. This is a valuable part of his discovery; for in France nearly two-thirds of the rural population are compelled to exist on rye bread, as being so much cheaper than that of wheat. By the admixture of potato flour, there would be a saving of outlay, and a gain in nutrition. It was stated at the academy that a company had been formed in Paris for the manufacture of the potato flour by M. Clerget's process, and that the same progress towards carrying it out on a large scale had been made in London."

Professor Johnston, in his letters on Scottish agriculture, contained in the October number of the Quarterly Journal of the Highland and Agricultural Society of Scotland, has some interesting and valuable remarks on the same subject, which, sustained by such authority, deserve careful perusal and serious reflection. He says: "Into this manufacture great improvements have recently been introduced, and the farina is converted into British *tapioca*, into sirup, and other articles which will find a more or less ready market. The waste fibre of the potato, which was formerly considered only fit for manure, is now converted into a wholesome nourishment for cattle; and even the washings of the starch, where skill and economy preside over the process, are collected and employed as a manure. You recollect the fact mentioned to us by Mr. Binning Home, that these washings, when allowed to run into the potato drills, had given, near Stirling, a larger crop of potatoes than was yielded by other parts of the same field to which guano and farm-yard manure had been applied.

"There is little reason to doubt that new uses and new outlets for the potato will, by-and-by, become generally known. The farina, in the form of *tapioca*, is gradually finding a more extended use, and in numerous other forms it is insinuating itself into our daily diet. In Germany, a method has lately been introduced of making flour from potatoes, which has not, I believe, been tried in this country, but which is recommended as giving a better, a more palatable, and a more abundant article of nourishment than the common process of preparing potato starch. This method consists in washing the potatoes, cutting them into slices as we do turnips, steeping these slices for twenty-four hours in water containing one per cent. of sul-

phuric acid, (oil of vitriol,) drawing off the acid water, washing them several times with pure water, drying them in a stove, and then grinding them in a common corn mill. The flour thus obtained is pure white, and the siftings or bran seldom exceed 5 per cent. of the weight of the dried potatoes. The sulphuric acid, in this process, extracts the coloring matter of the potato, with certain other substances, which would give the flour an unpleasant taste. This flour will not make good bread if used alone; it requires to be mixed with one-half or one-third of wheaten flour." Speaking on the subject of starch, after quoting some experiments made to ascertain the relative proportions of starch and water contained in 100 lbs. of different varieties of potatoes, he adds, that "on the whole, the red potatoes seem to be the best starch givers."

In one of the French journals, (*Moniteur Industreil,*) it is stated that 50,000,000 kilogrammes (equal to above 112,000,000 pounds) of potato starch are annually used in France for the manufacture of potato sugar.

The following results are said to have been reported to the Cork Agricultural Society, as the amount of farina or dry flour, fit for use, extracted from 20 lbs. of sound potatoes, or in various states of decay, viz:

Sound white potatoes - - -	3 lbs.	9 oz.	0 drachms.
Unsound and diseased part cut off - -	3	1	0
Unsound minions - - - -	3	1	0
Unsound and paired - - - -	3	0	0
Unsound, none cut off - - -	3	6	0

"Diseased potatoes, useless, quite soft, and rotten, will make as good starch as the soundest, and need not have the bad parts cut off, but should be washed to prevent the earthy particles from mixing with the flour."

In appendix No. 4 we have placed an analysis of above 60 different kinds of potatoes, which is taken from Dingler's Polytechnic Journal. Although the account relates to varieties found in Germany, still it may be useful as furnishing a comparison for analyses made of those elsewhere.

In the *Echo Monde du Savant* for 1842, we find the following recipe recommended as a good one for recovering watery potatoes. It has at least the merit of simplicity: "When boiled and watery, let them lie eight days before being used, near an oven."

Potatoes are used in most parts of the country, in connexion with other fruits of the earth, as food for stock of various kinds. Professor Johnston, in the letters already quoted from the Edinburgh Quarterly Journal, speaks of a process of preparing them for this purpose recently discovered in Denmark. He says: "As I have said so much on the subject of potatoes, I may as well describe to you a method which has lately been recommended in Denmark and Norway for making the potato more available and profitable in feeding cattle than it has ever hitherto been. You are probably aware that potato starch can very readily be converted into grape sugar, and that the sirup obtained from it is largely employed in the manufacture of brandy in the north of Europe, and even of the best brandy which comes from France. In the more northern of the French wine-growing provinces, it is also mixed with the less sweet varieties of grape juice, so as to give an additional strength and richness to the wine. One of the methods by which the potato starch is converted into grape sugar is, to mix it with one-tenth of its weight of ground malt diffused in water, and to keep the mixture for some hours at a moderate temperature. The starch dissolves, and the li-

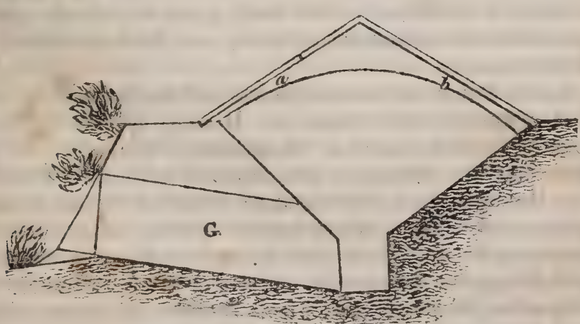
quid becomes sweet from its conversion into grape sugar. This is the method which Mr. Böggild, of Copenhagen, proposes to apply to the whole potato in order to bring it into a soluble state, to make it more easy of digestion, and thus to increase its feeding properties. He washes his potatoes well, steams them thoroughly, and then, without allowing them to cool, he cuts them in a cylinder furnished internally with revolving knives, or crushes them in a mill, and mixes them with a small quantity of water and three pounds of malt to every hundred pounds of the raw potatoes. This mixture is kept in motion and at a temperature of 140° to 180° Farenheit for from one to five hours, when the thick gruel has acquired a sweet taste, and is ready for use. Given in this state, the results of experimental trials are said to be—1st. That it is a richer and better food for milk cows than twice the quantity of potatoes in the raw state. 2d. That it is excellent for fattening cattle and sheep, and for winter food; that it goes much farther than potatoes when merely steamed, and that it may be economically mixed up with chopped hay and straw." Professor Johnston adds: "I have before me a pamphlet published at Christiana, by the Royal Society for Promoting the Improvement of Norway, in which this method is strongly recommended; also, a letter from Copenhagen, dated 29th April, 1845, in which my correspondent writes as follows: 'This invention has been more and more appreciated and applied in my native country, Norway, and in Denmark; and the great advantages with which stall-feeding may be introduced, at considerably less expense than formerly, made it suited to general promulgation.' The method has more and more gained adherents; and further comparative experiments, made by scientific and experienced persons, have proved its superiority. Thus, an experiment established the fact, that an increase of one and a half pounds of flesh is obtained from twenty-five pounds of potatoes; that the feeding of horses with this mash is found to be applicable and cheap; and all experiments confirm the fact, that potatoes used in this manner, as a food, amply afford doubly the nutritive powers compared to the food formerly used." The Professor, in conclusion, remarks: "I cannot here state my reasons for believing that there is really something worthy of attention in the alleged superior feeding qualities of the potato given in this state, but I can strongly recommend you to make experiments upon this subject. If the potato can in this way be converted into a larger quantity of beef, mutton, and pork, than has hitherto been the case, another outlet will be provided for the potato crop which may, perhaps, prove more profitable than even the manufacture of it into flour." The same observation is one, also, which is worthy of the attention of the large potato-growers of this country; though, on account of the abundance of other materials of fodder, our agriculturists will probably be little inclined to adopt any of the cheaper modes of feeding till necessity compels them, as it does in the older countries of Europe.

Another application of potato, it is stated, has recently been discovered in France, where (at Nice) a manufacturer, after six years' labor, has succeeded in producing excellent paper and pasteboard from a substance separated from the potato. The process is not given, however, in any of the foreign journals we have, nor have we seen any mention, except of the fact as having occurred.

The subject of *storing* potatoes for preserving them suitably, is one which likewise may be commended to the attention of our farmers. In Dingler's Polytechnic Journal for 1843, vol. 90, we find a description of an earth cel-

lar for this purpose, quoted from Riecke's Weekly Journal for Agricultural and Domestic Economy, No. 34, 1843. As it is highly recommended, we have subjoined a translation of the same:

"In the southeastern portions of Normandy is used for the preservation of potatoes a simple kind of earth cellar, which is certainly preferable to the usual modes, where the soil is not exposed to the pressure of the moisture. A round wedge-shaped pit, terminating in a small straight sided space, is dug in a place which has some elevation, that the moisture may the more certainly drain off. At the bottom of this pit there is a narrow entrance (G) either from the side, where the nature of the ground admits of it, or from above. The object of this is as follows: The potatoes will always be taken from the bottom, which has this useful result—that the whole heap of potatoes, which naturally sink down as often as any are withdrawn from below, remains in frequent motion. The sides of the pit must be well smoothed, and here and there burnt out with dry wood. The pit must be covered with a light roof of straw, which is so placed that it may be easily either wholly taken away when the potatoes are to be filled in, or at least some portions of it may be removed. Finally, the earth must be heaped up around the pit. Before the potatoes are brought into the pit, the surface, as is the case in other receptacles, must be laid with straw, especially on the bottom, in order to prepare the surface of the earth on the bottom and sides better. The pit is then to be filled up with potatoes, heaped up to the brim (*a b*). For protection against a greater degree of cold, some straw must also be spread out in the empty space between the roof and the potatoes. The mouth of the entrance, also, should be stopped up with bundles of straw. If there are many such earth cellars, they must not be broken up one after the other, but as nearly as possible all together. The excellent condition of potatoes in these earth cellars is celebrated. That the formation of one of them costs less labor than the labor of preparing the common earth cellar, or the usual receptacles, scarcely need be mentioned." The dimensions and shape of the one given in the Journal are as follows: G, as above mentioned, is the entrance; *a b*, the line to which the potatoes are to be heaped up, between which and the top of the roof is to be filled with straw.



A substitute for the potato is thus described in some of the public journals, the account of which is interesting, and may perhaps, at a future time, deserve more attention, and therefore we have concluded to add it to the pages of this report.

"*Substitute for the potato.*—We learn from the London Medical Times, that at a late meeting of the Academy of Sciences in Paris, it was proposed, in consideration of the disease of the potato, to introduce for cultivation in Europe a valuable South American plant, as a substitute for that wholesome esculent. The production referred to is the *Arrachia*, an umbelliferous plant indigenous in New Grenada, particularly in the most temperate parts of the continent, where the average temperature is 15° to 25° R. The Arrachia is generally three feet in height, its radical leaves twelve to fifteen inches in length, numerous, biternate, doubly incised, dentate, on long fistular peticles. The caulinar leaves are smaller than the radical, which they resemble in every other respect. The flower is a violet-colored umbel; the petals oval, accuminated and inflexed; five stamens and two style, arising from a disc of the same color as the flower. The fruit is an oblong carpel, marked with five ribs. The blooming season in October. The root is the part which is used as a fruit in the country as an article of food; it partakes of the nature of the carrot and the potato, being a kind of intermediate substance between the two. Each plant furnishes from three to four pounds of nutritious matter, one hectare yielding no less than 82,500 lbs. of wholesome food, and of course a great desideratum in the present failure of the potato crops."

It may not be inappropriate, also, at this time, to allude to the subject mentioned in the extract below. We can scarcely imagine that a vegetable of such extensive use, and so highly valued as it is, should only have been introduced into England about 350 years since. It might well deserve commemoration:

"*Festival to commemorate the introduction of the first potato.*—Festivals are frequently established to commemorate some absurd custom, but the following celebration, in honor of the potato, has something in the subject of it of real usefulness to mankind. Several of the German States, we are given to understand from the Athenæum, have instituted feasts in honor of the introduction of the potato; and the anniversary of its importation has just been held as a jubilee at Bavaria. At Menterschwaige, near Munich, a festival was observed on the occasion, in which dishes of the poor man's especial root, variously dressed, had the place of honor on the table, while the bust of Sir Francis Drake, crowned with garlands of oak, and presented to the commune for the occasion by its sculptor, Schwanthaler, occupied the centre of the room.

"In France, a monument is about to be erected to Parmentier, commemorating its introduction into that country. It may appear to our readers that the honor paid to the memory of Drake was really due to Raleigh; but it is probable that the Germans are literally correct. The first colonists sent out by Raleigh were disheartened when Drake touched at Virginia, and he consented to bring them home. Lane, the governor, who is believed to have brought with him the first tobacco, may have brought, and probably did bring, the first potato; if so, though indebted to the enterprise of Raleigh for the discovery, it was Drake's ship that actually introduced the first root."—*Bulletin of Medical Science.*

POTATO ROT.

When, in the report of last year, the potato crop was under consideration, it was hoped that if another year did not relieve us from its rav-

ages, at least so much light would be thrown on the probable cause of the evil as would enable us to remedy its destructive effects. To our regret, however, we find that such has not been the case. As a general fact, the effects have been more severely felt than before. While the public journals and agricultural papers have abounded with numerous articles embodying lamentations and suggestions as to the cause or remedy, we scarcely seem to be any nearer the desired result. It is well known, also, that a disease or blight of a most destructive character has made its appearance both in Great Britain and on the continent, which seems to be very similar to the one which prevails on this side of the Atlantic. We have derived one advantage from this circumstance which may essentially aid us in our investigations. Observations of scientific and practical men, conducted under all possible inducements to ascertain the extent and cause of the evil, and to furnish the best remedy or preventive, are thus brought to our notice, and we are enabled to compare these with such as have been called forth in our own country. As a general thing, too, the former are marked with a precision and minuteness of detail which evince a decided superiority in the mode of observation and deduction to the random conjectures of mere casual notice. There are indeed honorable exceptions in the communications made to our own journals; but there is too often a looseness of statement, and want of particularity and discrimination, which impair their value as materials on which to found any important conclusion. We know not the result of the offered premium by the Farmers' Club, and the directions drawn up by Dr. Gardner to aid the investigations of any one who might be disposed to obtain it. We believe, however, that no very satisfactory result has been reached. The amount of information on the subject, such as it is, is greater than in the previous year. The alarm then created has had its influence to turn the attention of many in all parts of the country to the first appearance, during the season, of the dreaded influence. The various views then suggested have still each its own supporters and advocates, and the statements made do not so decisively, in every respect, favor any one theory as to leave no doubt on the minds of many. We shall advert to the disease, first, as it appears in our *own country*, and to the facts which are recorded respecting its progress here during the last season; and then, also, for comparison, draw out the features of that which has occasioned so much alarm and distress in *Europe*. This method appears to us to possess some advantages, as there may be a similarity in some respect, and yet some distinctive and peculiar features belonging to either. We shall, also, for the sake of convenience, throw into two appendices the various articles and statements to which reference may be made, so that the opinions of those who may be considered exponents and advocates of any particular views may be seen in their connexion in their own language, including also such communications of our own correspondents as may be deemed best. This course may increase the size of this report, but such an arrangement possesses the advantage of placing these documents conveniently at hand for future reference and deduction, instead of its being needful to search through numerous volumes to find them. In the main, we adopt the course of arrangement for our remarks which was taken in the last report, though we shall here and there generalize or subdivide, as seems to be most expedient.

It will be unnecessary to advert to the *appearances* of the disease there

described, and minutely repeat them, and we shall therefore content ourselves with adding such other points as are new, or more clearly developed.

As there seems to be no variance of opinion as to the fact that the disease is not confined to any particular *kind* of potatoes, we do not deem it necessary to dwell on that point, except barely to say that the Rohans and long reds appear to be perhaps the most exempt. It seems to be the fact, as will be observed by reference to the articles in the appendix, that the evil in some cases has not prevailed where it did the previous year; though in many others it has done so even to a worse degree than before.

1. As to the *extent* of range embraced in its appearance. So far as we can ascertain, it appears to have been observed further east, west, north, and south, than in the previous year. It has been noticed in the British dominions, both Canada and Nova Scotia; it is mentioned as having been experienced in Illinois, Indiana, and Michigan, and as far down as the lower part of Ohio, in the southeastern part of the State. It may be, that the evil which is so characterized in some of these sections is nothing more than the common premature decay, produced by the ordinary atmospheric influences, as the accounts are not sufficiently definite to enable us to decide. Such seems to be the view taken by the editor of the Ohio Cultivator, who, after giving a statement from the Sandusky Democrat, says: "We are inclined to think that the rot which our Sandusky neighbor speaks of is not of the same kind as that which has for the past two years prevailed in some of the eastern States, and is now exciting so much alarm in most parts of Europe. * * * * Potatoes often rot both before and after being dug, from other causes than this disease; such as being killed by frost before maturity; an excess of wet, &c. And when buried in a heap, they not unfrequently become heated and spoil, by being covered too deeply before the weather becomes cold." We regret that there has not been more care, as this fact, among others, has an important bearing on the subject, and such neglect impairs the general conclusions which may be drawn.

2. *The particular period of the season* in which it has been noticed for the first time during the past year, is *earlier by a month nearly* than in any of the accounts of the year before. Thus the Worcester (Mass.) Spy, in reference to this subject, says, early in July: "The blight which caused such destruction to the potato last year has thus early commenced its ravages the present season. We have examined a field belonging to Governor Lincoln, which we are assured exhibited a perfectly healthy appearance on the *third* instant. On the *fifth*, portions of the vines showed indications of disease; and on the *seventh*, about half were more or less shrivelled—many of them shrunk to half their former dimensions, and some of the leaves already turned brown and nearly dry." Allowing this to be the same disease, this is an important fact. We are, however, left in some doubt as to this question, since the writer states that on opening one of the hills most affected, both the seed and the new set of potatoes were sound and looked well.

In the accounts given by Mr. L. Ford, also, of Cummington, and E. B., of Pompey, New York, the disease is said to have affected the vines on the 14th of July. The account of Mr. B. P. Johnson is dated July 18, and, he says, "within the last few days." Here are three independent witnesses, living remote from each other, and communicating with different agricultural papers; and in this respect their testimony has not a little bearing on the subject, provided it was the disease. But as, in their statements, with

the appearance of the vines simply, they do not connect the appearances exhibited with the tuber, except as to the probable result which they conjecture might have taken place. The appearances, and not the supposed causes they present, are the subjects with which we are concerned in this part of our examination, and hence we have not thought proper to refer to this point, except so far as it may enable us to determine the commencement of the cause, or at least its observed development. These are the earliest notices we have been able to find mentioned in the papers. From this time on through the month of July, we find complaints of the begun evil.

3. It is a question of some importance to determine the precise *point* where *the attack commences.* As the disease was not in general anticipated or dreaded in 1844, the earliest appearances were but little noticed, and the attention was mainly directed to the condition of the tubers and the partial or utter decay which they experienced. Little, comparatively, is mentioned during the past season as to the form of the evil on the root itself, but rather to the appearance exhibited *above ground.* There is great uniformity of opinion in this respect even among the advocates of different theories. Almost all agree in a certain condition of the vines as a precursor of the more fully developed rot in the tuber. Yet, at times, while looking at the accounts before us, we can scarcely avoid feeling that there may be a combination of two or more great causes to produce the effect. In very many cases there seems to be no effort to trace the influences any further than their earliest stage. By almost unanimous consent there are more stages than one. How far these may be modified by extraneous causes may properly be a subject of future examination. The *earliest* visible stage which attracts notice, allowing that one disease or evil is not mistaken for another, in whole or part, is in the *leaves,* and, it would seem, in those which are *extreme.* It does not, indeed, follow that here is the original seat of the disease. Such an appearance might take place merely as a first development, where its source might be found in the stem, or, in some cases, in the root. It is well, however, to note with the minutest accuracy, so far as we are able, the particulars which fall under the naked eye, or are discoverable only by the power of the microscope, and then the task is to be undertaken of discriminating between what may be *essential* or only *accidental.* We believe that, by a careful examination of the descriptions, something may be done, by strict adherence to this principle, towards removing errors. A *wilting*, *curling*, and *drying up of the tops of the leaves and vines,* is one of the most common and first appearances observed. On examination, it is discovered that the *stem* bears marks of an attack previous to that on the foliage. A brownish or dry spot is seen sometimes only small, then extending some inches on the vine. The place where this appearance has been observed is a *little above where the vine enters the ground.*

A writer in the Indiana Farmer and Gardener, over the initials "J. T. P.," and supposed to be Mr. Plummer, of that State, speaking of some observations made by himself, says: "The disease, in every instance, was found to be confined to the vines. These were generally affected near their entrance into the earth, a few inches above and a few inches below this point. A person, in a general review of the field, would perceive nothing but a luxuriant crop of potatoes; on passing watchfully along the rows, he would discover here and there some prostrated vines, with wilted leaves. On close examination, he would find at the points named a perfectly dry

decay of the stem; the pith entirely gone; the cuticle also removed or dried to imperceptible thinness, and nothing is left but the ligneous fibres, whitened by disease, and sometimes separated laterally. This is the worst stage of the disease yet observed. The parts below this point are perfectly sound at present. On turning to other stems, indiscriminately, whose leaves and vines are apparently in the full vigor of health, we perceive the earliest encroachments of visible disease. Here we see a little discolored patch of cuticle, dried up and sunken to the ligneous fibres below, the parenchymatous matter among the cuticular tissue having disappeared." On scraping away this dead cuticle, he states that the ligneous texture is still found to be living; " but in the next plant that is also decayed; and in still another, we witness the destruction of half the pith; and in another the pith is all gone; and then we arrive at the last stage, or total rottenness. In most instances, there are several such patches of cuticular decay, of irregular figures, but there is a well defined line of separation between the dead and living parts. On slicing, lengthwise, one of the vines in which these spots of decay have penetrated into or through the pith," he adds, " portions are found of solid, and apparently sound pith, in the intervening portions of the stem." "In several instances, also," he says further, " the returning sap being interrupted in its descent by the cuticular decay, formed small tubers (perfect potatoes) just above the diseased point." " There is no apparent erosion of the cuticle, but the idea is suggested of all the pulpy matter in it being abstracted, and the cuticular film collapsing upon the parts beneath." " We may safely say, upon these observations, that the disease undoubtedly commences on the *exterior* of the vines, and that the upward circulation is continued long after the downward current is partially or wholly intercepted; that the disease tends to penetrate into, and not to pass along the vines; the tops perishing only when no nourishment can be obtained from below."

We have quoted the above description, not only on account of its being evidently that of a careful observer, but as giving the most minute account we have found this year of the gradual development and progress of the disease. That the vines bear some important relation to the early stages of the disease, would also appear from the statement of W. Bacon, of Mount Osceola, who speaks of the evil as " first showing itself in a very small blotch on the side of the stalk, which continued to spread until it had gone round and through the stalk, when the last, at the particular point of the disease, became dry and hard, as though it had reached its maturity. The death of the top soon follows, but the lower part remains green for awhile." He also found that in this stage of the disease, " mowing the tops prevented the evil from being developed in the tubers." Mr. Pearce, of Hamburg, also said to be an excellent and observing farmer, " saw that his potato vines were affected, and pulled several hills to examine the roots. They were sound, and left separated from the stems or tops." " The potatoes in all the adjoining hills were rotten at the time of harvest." The Hon. J. Crary, of Salem, N. Y., in the Cultivator for April last, speaking of the appearance of the disease in 1844, says: " The first symptom of failure is in the stalks of the potato; they become dry, and the leaves turn black; the growth then ceases, and the potato becomes rotten before it is ripe. The fibres that connect the stalk with the potato quit their hold; and when you grasp the stalk and pull, with a view to raise the potatoes out of the hill, the roots break and leave the potatoes, or rather slip out of the hill without raising the po-

tatoes." "M.," likewise, of the Indiana Farmer, says: "I discovered that the leaves of the tops (of one patch) of my potatoes, which extended horizontally, were dead. They had the appearance of having been frost bitten, and were of a dark brown color. I took no further notice of it until two days after, when I found the entire tops were in the same fix, though they had always kept their erect position." The notice respecting the first development of the disease in the field of Governor Lincoln, in Worcester, already given, will also be recollected as speaking of the vines and leaves as diseased, but the seed and sets sound. "Philo," of Portland, likewise speaks of the first visible effect being noticed in a blight on the tops.

But there is yet another stage, it would seem, in which the vines are not necessary. The experiment of E. G. Buxton shows this. He planted in the spring a few potatoes in some dry tan-bark in a dark, dry place in his cellar. On examining them in October, he found a number of new potatoes of the size of a hen's egg down to a mite, which exhibited the same appearances of rot and disease as did other diseased potatoes. The same fact is also stated to have been observed in Germany by Von Martius, in 1842. (See his essay, translated and appended, among other foreign papers, to this report, in appendix No. 6.)

It is important for us to know the earliest indications of the disease before it is so diffused that it cannot be arrested. Means may then be more readily devised to check it in its incipient appearance, and thus this valuable crop be saved from the destructive ravages it now seems doomed to undergo. Would our farmers generally follow the example of Mr. Plummer in this respect, much more information could be gleaned as to this point.

4. As to the stage of the disease in which the *tubers* exhibit marks of its influence, the appearances do not vary much from what was observed the previous year. Mr. J. M. Weeks, of Salisbury, Vermont, speaks of it as in the form of a blister upon the skin; and it soon makes progress towards the heart or middle of the potato, forming, as the disease advances, a kind of fungus upon the surface of the tuber." In other cases, he says: "It is not uncommon to trace the disease directly down from the stalk in black streaks to the middle of the tuber." Mr. Freeman, also, of York, Maine, says: "The first appearances of the rot are dirty yellowish spots, similar in appearance to iron rust; it penetrates the potato, and, in a short time, turns to a dark color, and the work of destruction is finished. They appear to smell and taste similar to a frost bitten potato." The editor of the Monthly Visiter, after quoting from the Massachusetts Ploughman a communication of the Hon. Merrill Allen to the Old Colony Memorial, says: "In the fall of 1844, a few days before they were dug, the growth of the potatoes was arrested by the sudden dying of the tops, which seemed to be stricken as with the blight which frequently takes place at an earlier season. The vines being thus killed, we dug them perhaps a fortnight earlier than we might otherwise have done; and it was observed, when they were disposed of in their bed, that the skin peeled off easily." Mr. B. P. Johnson, of Rome, after first noticing the appearance of the tops, says: "In some instances, where the potatoes have been dug, on cutting them open a small black spot is found in the centre. In others, the potato appears sound and healthy." "N. N. D.," in the Cultivator of February, also, speaking of the crop of the previous year, says: "The rotten potatoes were full of long white worms," and "the odor was intolerably fetid. This, of course, was at the most advanced period of the development of disease."

Another fact observed is, that the tubers, when dug and stored away apparently sound, even when the crop while growing exhibited a generally healthy appearance, have rotted. The case has been mentioned in the public journals of a gentleman in the interior of Massachusetts, who sent several hundred bushels of potatoes to Boston apparently sound and good, but which, soon after their arrival, he was requested to call and take away, as they were decaying and most offensive; and out of 600 bushels he obtained 100 bushels of sound potatoes. There seems to be no reason to doubt that the tubers may be found in very different states even in the same field, and sometimes also in the same hill, exhibiting a progress which, if more carefully observed, might aid in more accurately fixing upon the point where they might be used, or otherwise.

4. *As to the kinds of soil, locality, modes of culture, &c.*, there is still a diversity in the accounts furnished. These vary according to the various theories adopted by various individuals to account for the evil. To advert to some of the statements.

(*a*) *Soil, locality, &c.*—Both old ground and new ground were tried by Mr. Colt, of Paterson, New Jersey, and the *new* ground gave the best yield. The editor of the Monthly Visiter says that, in the high grounds, in 1844, where the latest broken up pasture grounds have usually produced the best potatoes, the greater portion of the crop was lost—more so than in other grounds. Mr. A. Robinson recommends light ground, which, he says, is so porous as not to retain the abundance of wet, &c. Mr. Rhoades says, respecting a crop in 1844: "One field was new land, very high and dry; the other was older land, and moister. Every potato grown in the first field was sound; but in the other, some were diseased. The next season (1845) one of the lower fields was again planted, using seed from the high ground. The summer was drier than in 1844, and the produce was all sound, as was that also on the adjacent green sward, planted with the same seed. On part of the green sward, planted with infected seed, more than half the crop was lost." He concludes that low moist localities are most obnoxious to its influence. Mr. Lane mentions that where land descended towards the north, he found his crop much better than in other exposures. Mr. Hammond, of Conesville, says, with reference to the crop of 1844, that "on dry cool lands, not rich in putrescent manures, the crop escaped." It was observed by different persons in the New York Farmers' Club that potatoes from a copper region, and also from an iron one, did well. It would be interesting to ascertain the geological condition of those particular regions where the disease has been the worst.

(*b*) *Culture, &c.*—The use of sound tubers seems to be not always considered indispensable. Mr. Thompson, of Astoria, stated in the New York Farmers' Club that he cut off the sound part from *diseased* potatoes of last year, and planted them with perfect success. So Mr. Townsend, of Astoria, also planted from the diseased crop, and had potatoes. In most cases, however, it is stated that the seed was sound, though this did not always secure from disease. Potatoes planted in manures that are rich and highly putrescent appear to be most liable to the influence of the rot. Mr. Weeks, of Vermont, says: "My own observations, corroborated by the testimony of hundreds of others, show, very clearly, that when the land is manured with that kind of manure which is highly charged with ammonia, the malady is most fatal. Where the same land was planted side by side, if manured with manure so rotted as to have lost its smell, very little disease is

found. Manure in a state of fermentation, when applied to the potato hill, or manure that will ferment, will be apt to engender disease." He adds: "We suffered greatly by the malady last year; this year we have taken a different course in the preparation of our potato lands. Instead of using any manure, we selected land that was highly dunged last year from the sheep pens and cattle stables, and was in corn. We ploughed twice, as usual, and planted early in May, three feet apart both ways; we cut the potatoes, and used as much lime as would stick without water. As soon as the plants were out of the ground sufficiently to live, we made a compost of salt, leached ashes, lime, and plaster; incorporated the whole together, and top-dressed every hill with a table-spoonful of the compost, and covered it in the hill at hoeing; hoed twice; then in July sowed salt broadcast, two bushels to the acre. The potatoes were good." "Philo," of Portland, says: "Potatoes rot most where they come in contact most with manure. Manure coming in immediate contact with the growing crop, by being put in the hill or spread upon the ground, forces its growth, especially of the tops, too fast." "I am apprehensive that manuring on the top of the ground, and in the hill, induces too much growth in the early part of the season." "I am inclined to think that potatoes would do better, all things considered, without any manure in the land. But should manure be applied, let it be ploughed in to the depth of 15 or 16 inches, if possible." He also suggests drilling as useful. Mr. Sanderson, of Chesterfield, New Hampshire, states that he planted his seed as soon as the ground would admit of it, and manured them in the hill with well-rotted manure; planted the largest, and was careful to get none that were not sound; kept the ground free of weeds till autumn, and dug them in the middle of October: they were good; while his neighbors complain that their potatoes were rotten. Mr. Robinson, after stating that nowhere had he found any rot on light soils, while on moist soils highly manured it appears to have had great effect, adds: "This year I was so wary as to plant all light ground—some sward and some old ground—all planted early; all manured lightly in the hill with compost manure, made from rich low ground, hauled into the yard after haying to mix with cattle manure, and hauled out in the fall. This kind of manure will not ferment. My crop this year is tolerably good, and all sound. It is found that the early planted better escape the rot than the late." Mr. Freeman, of York, Maine, says: "But few if any escaped, except the *early* planted, and not even these when planted on unfermented manure." Mr. McGuffy, of Ohio, states that he planted 2 patches of potatoes of about one sixth to one-fourth of an acre each. "One of them was on land on which cattle had been fed or fattened with corn the fall previous, by which means it was highly manured. On this land one bushel of seed was planted, of the Meshannock variety, cut into small pieces, and 3 or 4 pieces dropped into a hill, the hills 4 feet apart, and the ground well cultivated in summer." "The tops grew with great vigor, covering the whole ground, and, owing to the fine rains in autumn, they continued to grow until destroyed by the frost in autumn. The crop was large, and the potatoes of a very fine quality." "The other piece of land was planted with 3 pecks of the same kind of seed; but *no manure* had been applied, and less labor was bestowed in cultivation. The weeds were allowed to grow after wheat harvest, and the tops, which were much less luxuriant than the tops of the other piece, were all ripe and dead before the frosts came. The yield was less by one-half than in the other case." "Both of these lots of potatoes were dug at

the same time, and buried in the same manner, in trenches in the ground. In a few weeks it was discovered that those from the rich ground, and which had their tops destroyed by the frost, were beginning to rot. The disease spread to such an extent that it was doubtful if any of them would be saved. But those from the ground which had no manure, and where the tops ripened before the frost came, have not shown any symptoms of decay." In two neighboring fields, in one of which the potatoes were ripe before the frosts appeared, there were no signs of rot; while in another, in which they were green until the frost killed them, they had nearly all rotted. The Hon. Mr. Crary states that those which were covered deep were as good as usual, and those with a shallow covering were useless. In a case stated by Mr. Hammond, of Conesville, some potatoes were planted where potatoes had been buried the year before, and the straw used about them turned over for manure; they were more rotted than anywhere else. Some persons made use of lime, and the potatoes rotted; others used lime, and had good potatoes. New varieties as well as old were affected; and in the case of Mr. Dox, a variety from the ball also were affected by the disease. Potatoes whole and cut seem equally to have felt the effect of the evil.

The letter of Mr. Chase, of Calais, Maine, contains some interesting particulars, which deserve notice under this branch of the subject. It will be found with the other letters and statements already referred to in the appendix No. 5. He says: "Some of my seed-potatoes I cut, and put lime with them in the hill at planting; some I planted whole, with lime; some cut and some whole ones without lime. Some seed I procured from a distance, and which was grown on an entirely different soil. In some of my compost manure I made use of a large quantity of potash. In all these cases the disease upon the potato was apparently the same; nor did the quantity or quality of the yield vary. The greatest difference was found in potatoes planted in different soils. On that soil which was stimulated most by manure, and especially by manure in the hill, the rot was the greatest. On dry loamy soil, the disease did not affect the potato so much. On wet land, and especially on wet clay land, the disease was the most fatal. It was observed that where lumps of clay lay so near the new grown potato as to touch it, the potato would be rotten on that side touched by the clay. The potatoes which grew nearest the surface and nearest the stalk were also observed to be most rotten. Those soils on which the salt rock-weed was used as a manure in great abundance, and where the influence of the salt water fogs was felt, were equally if not worse affected by the disease." The statements in the preceding letter are important, on account of their bearing on the different suppositions which have been adopted respecting the nature of the disease and its desired remedy. Mr. Slingerland, of Bethlehem, New York, in a letter communicated to us, speaks thus of an experiment the past season. After mentioning that, in 1843, he sent to Long Island for a particular kind of seed, and that they rotted worse than any he had before employed, he says: "Last year, 1845, I planted four acres more of the same kind of seed, and in the last of May I planted six acres more in the same kind of soil—a sandy loam; the four acres planted early did not yield as much to the acre as the six acres I planted late, but the early planted were all good, with few exceptions; the late planted, one-half of them rotted as soon as they were dug, and the other half were not fit for market. I had to feed them out to the cattle. I then made inquiry of my

neighbors about their potatoes, and they told me that the early planted were good and did not rot. The superintendent of the poor-house of this county planted thirty-five acres. He planted them all early, and he told me that they were all good. The late planted potatoes were full of water when the frost came and killed the vines, and this caused them to rot; the early planted, when the frost came, were ripe, and no sap in the vine or in the potato. We dug the early planted in the morning, and let them lay in the sun till night, and dry, then picked them up and put them in a dry place, and they kept good." One farmer was mentioned in the New York Farmers' Club who is said to have pulled up twenty hills before they were fully ripe, and scraped away again the earth around the hills; the whole field rotted save the twenty hills.

5. *The influence of the season*, so far [illegible] as observed, deserves notice also in a collection of facts [illegible] respecting the operation and progress of this evil. It is not necessary [illegible] in this place to bring into consideration any particular theory as regards the relation the facts have to its proximate or immediate cause. Our object is to record whatever may have been deemed of sufficient importance to attract the notice. In general, we know that the season was very dry and hot during the month in which the growth of this plant usually takes place. Mr. Freeman, of York, Maine, under date of September 25, 1845, alluding to this subject of the weather, says: "Last year the rot seized the potatoes about the last of August. It will be remembered that in this section of the State we had very warm weather, with frequent rains, about that time, and it invariably cleared off very warm; when, formerly, it generally came off cooler immediately after rains. This season has been the warmest for many years. The rains in this section commenced one month earlier than last year—say the last of July and first of August; consequently, the most of potatoes, excepting those planted very early, and of an early kind, were young and tender when these rains commenced. The soil being heated by many days and *nights* of sultry weather, actually scalded the potatoes, and but few, if any, escaped, excepting early planted, and not even these when planted on unfermented manure. It will be remembered that, though we had frequent rains, they were not heavy ones; barely enough to wet the manure in the hill, which doubtless caused them to rot more rapidly than if the rains had wet down deeper. It will also be remembered that the sun came out very hot after these rains, killing the vines of the potato, whilst the heat and wet under the surface were doing their work of destruction to the young and tender tuber."

Mr. A. Robinson says: "The past season has been one of great extremes of heat, dryness, and moisture. I speak particularly of our vicinity, where the earth was so severely parched, wet, and dry, that we had nearly given up hopes of a crop. After a very heavy rain, it remained hot, while we had alternate extremes of heat and rain, which set the earth in great fermentation—a state very injurious to some sorts of vegetation."

The editor of the Massachusetts Ploughman, commenting on Mr. Ford's communication, speaks also of the hot weather, and says: "It is certain that we have not had a warmer season for a long time."

Mr. B. F. Wilbur, of Buttervale, August 30, says: "The season here, from the middle of July up to the present time, has been uncommonly warm and wet; whether this blight will be followed with disease in the root similar to that of late years, is a matter as yet alike undeterminable. Time, however, will soon tell. It is to be feared that the rot will follow. Potatoes in

this vicinity, up to within about 10 days or a fortnight, have looked very promising of a heavy crop."

6. *The gathering and storing the potatoes*, with the circumstances which were observed at that period, are also worthy of some notice, so far as any thing peculiar is stated. We may, under this branch of the subject, again refer to the letter of G. F. Chase, of Calais, Maine. He says: "One experiment I made, the result of which I think important. As the potatoes were dug, a part of them were put into barns, and a part put in heaps of 50 bushels each on a dry part of the field, and covered first with straw, and then with dirt four or six inches deep. I left them here as long as it was safe on account of the frost. We found, on taking those from the barns to the cellar late in the fall, many of them had rotted, and others looked sickly. But those we took from the heaps in the field to the cellar, being the latest removed, were as bright and sound as when dug, except a few which had entirely rotted, and which we supposed had commenced rotting before they were put into the heap."

Mr. Wilbur says: "We would caution farmers not to be in too much haste to harvest their potatoes; the tops may be dead; the bottoms, by remaining the usual time in the ground, will be likely to improve. Besides, I am inclined to the opinion that by letting the potato remain in the ground till the proper time to dig, may tend to make it keep better after it is dug." The editor of the agricultural paper which contains this letter approves of the practice of letting the potatoes remain in the ground till they are fully ripe. Mr. Bacon, of Mount Osceola, says: "In one case, a farmer dug a very few hills when the vines first showed symptoms of disease, and carefully buried them and let them remain until the usual time of digging, when they were taken out all sound, while most of his crop had suffered essentially. There can be no doubt that when potatoes are dug so early as the rot came last year, they must be put in small bodies—kept cool and excluded from the atmosphere. Their tendency to heat, and thus become heavy and insipid, warrants us in this conclusion; and so we infer that the letting them remain in hills with the tops taken off until the usual time of digging is a much cheaper and better way than to dig and put in cellars, or on floors in piles. Another course of proceeding which has come under our observation was adopted by some Irishmen, who had known this enemy to their favorite esculent in 'the old country.' When they saw the crop smitten, they dug it immediately, and piled the potatoes on the surface of the ground, taking care to guard them from sunshine till the job was completed, when they covered the pile entirely with clay. The result was probably as they had known it to be aforetime—their crop and the potatoes of good quality. The clay undoubtedly acted as a twofold agent; kept them cool, and excluded the atmosphere and storms."

The editor of the Monthly Visiter, speaking of the crop of 1844, says: "The top of the bed was kept open, as far as it could be safely done, until the approach of severe frost. We are inclined to think that the potatoes perished, in consequence of being taken out of the air, perhaps a fortnight too soon." "Our belief is that the effects of the disease, which appeared on the killing of the vines, might have been avoided by keeping the potatoes in the ground until they had been perfectly ripened." Another person says that part of his crop "were carried directly into the cellar and put in a barrel; the remainder were put upon a wood-house floor, where they remained two or three days, till they were well dried; after which they were

put in the cellar. Those which were first put into the cellar in a barrel decayed entirely, while the others remained sound, and were good potatoes for cooking."

7. As to the point whether the disease is *contagious* or *epidemic*, we have met with but litte additional information. Instances are mentioned of potatoes in the same hill being partly sound and partly diseased; but this would not absolutely prove anything, as, even in the case of contagious diseases, (admittedly so,) it is not a necessary result that every person who is brought into contact with the person diseased becomes affected. In general it happens, but not always. And so, even were the disease of the potato contagious, they might equally and independently be affected with the same general malady, but not of necessity borrowed of each other. The question whether or not it is *epidemic* will be decided by different individuals, very much according to the theories which are adopted respecting the origin or source. There are facts stated which are alleged to be both for and against the supposition.

8. The views entertained respecting the *origin* of the evil are numerous, but may be included under three or four general divisions. Some new suggestions have been added to those before advanced. It is believed, however, that in many cases *accidental* circumstances have been mistaken for *essential* particulars. Whatever cause may be supposed, there will necessarily be some modification of its appearances, produced by various extraneous influences; so that it is proper, as far as possible, to confine ourselves to what may be viewed as truly essential in ascertaining the nature of the influence by which the great evil has been caused.

(*a*) The *insect* theory has still its advocates. The existence of a worm is stated in the Northampton Courier, as observed by Dr. Stebbins, but the statement is too indefinite to fix it as the origin of the particular evil now under consideration. So, the editor of the Pittsfield paper speaks of "a potato vine to which was attached insects, and, on cutting the stalk, a bug about one inch long was found in the centre of the same;" but this obviously could not have been the general cause of the disease, for no such appearances are generally mentioned. Dr. Lee, the editor of the Genesee Farmer, likewise, it is stated in a public journal, has made examination of the potato crop throughout central New York, and finds in all the cases that the "curling and blight of the vines is attended by an insect. The parent is probably the beetle. It punctures the vines just above the ground, and deposites the egg in the pith of the stalk where it hatches. The larvæ eat off all the stalk but the outer bark, when the vine withers and dies." It is also added: "Dr. Lee thinks that this prevents the ripening of the tubers, and disposes them to decay." We have not seen the statement of Dr. Lee himself, if it has been published in detail. It will be observed, however, that the description respecting the appearance of the stalk corresponds very accurately with that mentioned, and which we have already quoted, by "J. T. P.," (quere? Plummer,) in the Indiana Farmer, &c.; also those of W. Bacon and "E. B."

Another view respecting the operation of insects in causing the evil, is that which attributes it to the attack of a little *bug*. Thus Mr. Ford says: "This morning I examined some of my potatoes, and found some of the leaves of the top and stems dead, and many of them wilted; and among them a little bug about the size of the cucumber bug, with a sharp beak, with which he was piercing the stem. On further examination, I found

them on almost every hill; they were very active, and, by dodging or flying, would elude my grasp. Whenever they punctured the stem, it would seem to wither almost as soon as if broken off. Now my opinion is, that these bugs, by puncturing the stem, drawing off the sap and perhaps poisoning it, are the cause of the disease; and the tops being thus affected before the potatoes are ripe, causes the root to rot. On referring to Doctor Harris's report on the insects of Massachusetts, I find this kind of bug is the *phytocoris lineolaris*, of the order called Hemiptera, and is described on the 161st page." The editor of the Massachusetts Ploughman, to whom the letter of Mr. Ford was addressed, in July, 1845, says: "We think it probable that insects contributed to the disease of the potato last year and the year before. The hot weather, also, contributed to increase the mischief and to encourage these insects. There may have been several causes conspiring to produce the effect that was witnessed last September. It is certain we have not had a warmer one for a long time. Dr. Harris noticed this insect on the potato in 1838, when much mischief was done by it. We think it more philosophical to suppose that grubs or insects are the cause of the blight in potatoes, than to suppose disease in the plant."

Respecting the insect above mentioned, Dr. Harris observes: "It is most abundant during the months of June and July. It seems to be very generally diffused throughout the Union. The history of this species is yet imperfect. We know not where or when the eggs are laid; the young have not been observed, and the insects, during the early period of their existence, have escaped notice, and are only known to us after they have completed their final transformations."

The insect theory, in another form, is advocated by B. F. Wilbur. We have three communications made by him to the Massachusetts Ploughman; one of August 26, another August 30, and yet another in October, 1845. In the first he says: "I have examined one or two pieces affected, and find the *blight* (if so it may be called) caused by an insect of the species *aphis*, or *plant louse;* and so rapid is the ravage in some fields, that the tops bear somewhat the appearance of having been touched by the frost. Probably wherever the insect attacks, the tops will prematurely die." Again, August 30, he says: "Naturalists have described numerous parasitical insects, but among them all I do not find a single description in the books which exactly answers to the *aphis* of the potato—for so I shall term it. It is, however, so like the aphis of other plants, that it cannot be mistaken as to its class. I have never seen anything of the kind on potatoes before; others perhaps have." He thus describes it: "It is of a transparent green color, varying in size from that of a tobacco seed to that of a duck shot, and the largest size have wings. They are generally found on the underside of the leaf; wherever they feed the blight shows itself, and the probability is that they extract the vegetable juice or sap, the loss of which to the plant causes the mischief. If only the stem be attacked, the whole leaf withers and dies. I remember when the blight struck my potato crop in 1838, the tops looked at that time very much as now. The bottoms, also, then were affected. But at that time I did not think to look and see whether any insects preyed upon them as now. I think it most likely, however, that they did. Last year I did not notice much that appeared like blight in my potato field, though the bottoms in spots were somewhat affected with the rot at harvest time. Whether this *blight* will be followed with disease in the root simi-

lar to that of the last year, is a matter as yet undeterminable. It is to be feared that the rot will follow.

Again, in October, Mr. Wilbur writes that he had been visiting some of the best farming towns in Piscataquis county, in Maine, and says: "I was at the trouble of examining several fields, and in every instance found the *aphis* preying more or less on the tops. The rot, as apprehension was expressed in a former communication, has set in." "I shall not attempt to theorize on the subject of this potato disease—for so, I suppose, every body is agreed to call it—though I am strongly of the opinion that *lice* on the tops is the sole cause of it. It is very natural to suppose that a premature decay of the tops will have a corresponding effect upon the bottoms."

A writer who signs himself E. B., at Pompey, New York, also mentions, in a letter to the New York Tribune, quoted in the American Farmer, the appearance of insects, to which he attributes the cause of the potato disease. After stating that he had just observed a few tops of his potatoes beginning to wither and curl up, he says that he examined the withered tops and soon found a green fly, about one-fourth of an inch in length, upon every top that had begun to wither, and on most of them two; some had four, and a few six. "On one top I found four young flies, about half the size of the adult, and on three others one each, about one-fourth grown. This insect, I thought, must be the cause of the disease; commonly called the curl-top or potato rot, since I found it on every diseased top in 30 or 40 cases; and, usually, on that part of the plant which had begun to wither, near the healthy part of the stem. On the stem of one where there was a small globule of viscid transparent liquid the stem had begun to droop, but only so that it could scarcely be observed. Another globule, on the upper side of a curled leaf, on which a fly was sitting, was found to be sweet. Many of the leaves that were much wilted felt as if a glutinous liquid had been spread upon the upper surface." "In almost every case two flies were found on the same plant, differing a little in size and color; the lesser being of a darker green, and the larger containing many eggs, which it appeared to be depositing. Only one egg was found in the stem of the plant, yet there were many places apparently stung upon the diseased stem, and the effect of this reached down, in some cases, three or four inches into the heart of the stem." "From the above observations, these conclusions appear to be evident: that the sting of this fly causes the curl-top; that it breeds upon the stem, and the numerous progeny live upon the plant, sucking up its juices and its vitality."

The editor of the American Farmer remarks: "We readily conclude that the green fly found on the potato vines, as above described, would affect the quality of the potatoes, preventing them from arriving at maturity, and if left for any considerable length of time in the ground after the tops had begun to decay, would produce a second growth, by which the tubers would be rendered useless for cooking; but we doubt whether the fly here spoken of is the *cause* of the *general* rot, which has been so prevalent of late years."

The insect above mentioned seems to correspond well, in most respects, with the genus *aphis*, described by Dr. Harris, one species of which is said to be the probable cause of the blight in the peach tree. He speaks of their ejecting "a honeyed fluid," the result of their sucking up the sap of the plant which they attack. Dr. Camp and Mr. Patillo, both in the Cultivator, and Milton Burril, of Stockbridge, mentioned in the Bennington

Gazette, also express their opinion in favor of the idea that insects are concerned in producing the disease. Whether or not these insects may be viewed as *the* cause of *the disease*, it must be allowed that they are the cause, probably, of *some of the effects* observed. One of our correspondents, alluding to the insect theory, says: "It has not as yet been shown satisfactorily that any unusual insect has made its appearance upon the potatoes that have suffered from the rot, and this cause can be considered as little more than a mere conjecture. There are, indeed, several insects that, in almost all seasons, infest the potato plant more or less; but though when unusually present they may, to some extent, injure the goodness of the produce, either in quantity or quality, yet they have never been known to produce the decay in question, and it seems to me that I have seen these insects far more numerous in former years than last year."

(*b*) A second opinion attributes the disease to a *deficiency* or *excess* of materials for the progress or growth. We mean, by this general statement, to embrace under this head those who find this deficiency or excess either in the *soil* or in the *potato itself*. Thus Mr. Shaw attributes the *rot* or *rust* to *cutting the seed*, by which the skin is wounded and a perfect crop prevented. But, as the editor of the Maine Farmer says: "Potatoes have been cut for a long time without producing the disease; and why should it? Others, therefore, suppose that the seed has become so deteriorated as to be wanting in the requisites for producing a fair tuber or a full crop. But potatoes of the diseased crop have been planted, and no disease resulted." A writer in the Farmers' Cabinet, under the signature of *Chemico*, supposes the difficulty to be in *the deficiency of an alkaline basis*. He says: "It is well known that the substance forming the cells of all plants is a compound of carboniferous matter, with one or more alkalies, together with silex, &c. It is also well known that if the cellular matter is deficient in alkaline substances, &c., it is comparatively weak and unable to contain the matters deposited in it. It is well known, too, that the alkalies regulate the formation of the acids in the healthy vegetables, and that when there is not a healthy supply and a sufficient one of alkaline bases, the vegetable either contains a superabundance of acid, or its growth is impeded. In the former case the vegetable is not fit for culinary purposes. Now, I believe that, in the case of the disease of the potato, the cause is to be found in a deficiency of alkaline bases. This is manifest from the want of power in the cellular substance to perform its offices, and it is also manifest from the presence of acid in the potato. In consequence of this deficiency of alkaline substances, the potato plant forms an alkali peculiar to itself, which is very poisonous in its nature, and which I doubt not produces the fatal effect sometimes consequent upon eating the diseased potato." This view of the case is advocated to greater length in the letter of our correspondent, Mr. Thos. Crofts, of Wilkesbarre, Pennsylvania, which appears to contain the admission also that he is the writer above mentioned in the Farmers' Cabinet. His letter, addressed to the Hon. H. L. Ellsworth, on the supposition that he was still Commissioner of Patents, will be found with the others in the appendix No. 5, before mentioned. Professor Mapes, of New York, in the Farmers' Club, also throws out a suggestion that the rot may be owing to the *absence of copper*. *The deficiency or excess of ammonia* is also suggested as a cause by Mr. Weeks, of Vermont, in the Boston Cultivator, and the *want of starch* in the potato, by others.

The action of manure on the plant, and forcing its growth unduly, may

be ranged under that part of this branch which relates to excess of proper materials. Manures which are highly putrescent, and such as are apt to act too vigorously on the plant in its tender growing state, are said to be very injurious to its production. Unfermented manure is also ascribed, by some, as the great cause of the evil; but the fact is asserted, also, that the rot has prevailed where this condition did not exist. *Excess of moisture* is said to be the origin by "G. S.," of Pendleton county, South Carolina, in the Cultivator of May, 1845, page 150. He thinks that a superabundance of sap collects in the potato, and that this fact would be seen by cutting the tops, and that much water would be found to have discharged from the standing stumps. But as this is mere conjecture, and no particular experiment is brought forward to sustain it, it is unecessary to do more than mention it.

(*c*) *The influence of the atmosphere* is still insisted on by some. The advocates of this theory do not precisely define the limits which they would assign to the supposed cause. Mr. Freeman, of York, in his letter to the Boston Cultivator of September 25, seems to adopt this view. After adverting to the fact that in the previous year the rot appeared about the last of August, which he attributed to the very warm weather, with frequent but not heavy rains, which invariably cleared off very warm, he says: "This season has been the warmest for many years; the rains in this section commenced one month earlier than last year, say the last of July or the 1st of August; consequently the most of the potatoes, save those planted very early and of an early kind, were young and tender when these rains commenced." "The days and nights being very warm, thus greatly injured," as he supposes, "the plants, the rains being barely enough to wet the manure in the hills; and the sun came out hot, killing the vines, while the heat and wet were destroying the young and tender plant or tuber." Mr. Weeks, of Salisbury, Vermont, also, in the Cultivator of September 1, gives his theory on the action of the atmosphere as follows: "I am inclined to believe that the disease is caused by the atmosphere, chiefly operating on the earth in such a manner as to obstruct its natural circulation of sap, which prevents exhalations of the plant, and deranges nature's perfect operations by preventing the escape of the excess of ammonia which accumulates in the hill, and is held there in a state of unnatural confinement by the disease of the stalk and the crust which forms upon the surface of the ground, which makes the hill nearly air-tight. The ammonia in the hill engenders disease, which usually, under these circumstances, makes its appearance in the form of a blister upon the skin. In other cases the ground appears to crack near the root of the vine, so that the ammonia escapes so rapidly that the vine is killed at once," &c. As reasons to support his view, he alleges, first, on the observation both of himself and hundreds of others, that "where the land is manured with that kind of manure that is highly charged with ammonia, the malady is most fatal. Secondly, where the same land, side by side, is manured with manure so rotted as to have it smell, very little disease is found. Thirdly, the hardiest varieties of potatoes are not so liable to the disease as those which are more tender and feeble. Fourthly, that kind of compost possessing no smell of ammonia will invigorate the stalk and elude the disease." "Manure that is in a state of fermentation, when applied to the potato hill, or manure that will ferment, so as to exhale ammonia to any considerable extent during the growth of the plant, will be likely to engender disease," &c. "M.," of the

Indiana Farmer, after mentioning the appearance of the tops of the potatoes, (already quoted above) says: "I attributed it to too much wet, as they were situated where the water (when it falls copiously, as it has of late) stands for some time after falling." Mr. Lodge, also, in a letter read in the New York Farmers' Club, says: "Our seasons vary—sometimes very hot and dry, followed by heavy freshets and floods. Lands thus drenched, and not drained by proper deepening, and breaking the hard pan, must suffer, and will inevitably cause curl in the leaf, premature its growth, and stop the progress of the tubers, and in this tender state disease will follow." Mr. Townsend, of Astoria, in the same meeting, said: "I believe that this disease is owing to the seasons." Judge Van Wyck, also, in the same club, said: "Climate and seasons no doubt aggravate the disease. I found it existing three years ago on my farm in New Jersey, in a wet season; and in the next season, which was dry, worse still. This last season, which was very dry, the rot was worse yet. The editor of the American Farmer, remarking upon the views of "E. B." relating to insects, says: "We incline to the belief that the rot is to be attributed generally to atmospheric influences, an undue or premature springlike weather in early fall, causing the potatoes which are at a vigorous growth, though not fully matured or perfected, to begin to shoot or to grow, in manner as though they had been planted for the purpose. This premature process ferments the tubers to an incipient state of decomposition; and hence the withering of the vines, and the consequent deterioration of the crop." He states, also, that the same idea was thrown out by Mr. Gowen, of Mount Airy, in his report of crops in 1843, published May 29, 1844, in the American Farmer.

A. Robinson, in the Boston Cultivator of December 20, 1845, seems disposed to adopt the theory which explains the disease from the influence of the weather, &c. He says: "In the first place we know that the potato is a tender plant, and cannot withstand a great deal of hardship; we know, too, that the past season has been one of great extremes of heat, dryness, and moisture, and consequently unpropitious for the potatoes. I speak particularly of our vicinity, where the earth was so severely parched, wet, and dry, that we had nearly given up all hopes of a crop. After a very heavy rain it remained hot, while we had alternate extremes of heat and rain, which set the earth in a great fermentation, a state very injurious to some sorts of vegetation." Mr. Cole, of the Boston Cultivator, in a late agricultural meeting in Boston, (says the New England Farmer,) "thought the rot should be ascribed chiefly to atmospheric influence. He said that apples of various kinds had been affected in the same way. Jewett's fine red he had known for thirty years, and he had never seen it so much affected with rot as in the last autumn. He thought the atmosphere might affect various kinds of fruit, in the same way as it affects the potato."

From the above views it will be seen that the opinion of an atmospheric influence is one which has some, who are both scientific and practical men, in its favor. There is not, indeed, an agreement as to the manner in which the action of the atmosphere affects the result; but much is undoubtedly attributed by many to this as a great general cause of the evil under consideration. Even if it be not viewed as a *proximate* cause, it would be viewed by some as a more *ultimate* one. But such a fact would need a series of observations for more than two or three years to form a satisfactory conclusion, since coincidences might exist for two or three seasons without there being any thing of the nature of cause and effect, if we consider the words to

imply origination, or any thing else than the relation of simple antecedent and consequent.

(*d*) The *fungus* theory is probably, on the whole, the favorite one among those who have written on the subject in our country. It will be recollected that in the last report two letters were given of Mr. Teschemacher, of Boston, advocating this view. We learn that he still maintains the same opinion. In his letter to the New England Farmer, under date of November 19 last, he says: "The fungus that I have seen vegetates on and thickens the sides of the cells of which the potato is composed, which cells contain the grains of starch. The starch is not injured until the sides of the cells rotted by the fungus burst; the worms or maggots breed, and the whole finally becomes a mass of putridity, with an offensive fungus-like smell." He also fortifies his views by a reference to those of Professor Morren, of the University of Liege, and which will be adverted to when we come to the consideration of the disease as it has prevailed abroad. In a letter also received at this office from Mr. Teschemacher, which will be found in the appendix among other papers, he also considers the views adopted by the British professors, and urges the following objections against the atmospheric theory, which attributes the disease to the cold uncongenial weather. He says: "But quite decisive objections to this view are, 1st. That we have had a warm and dry summer on this side of the Atlantic, with more than a usual proportion of sunshine, and yet the disease has spread with equal fatality here. 2d. That they have had many such wet, cloudy, and cold summers before in Europe, without the appearance of this peculiar disease in the potato. It is clear, therefore, that this so called atmospheric influence is merely a name, without any distinct tangible meaning; and the evil of accounting for the disease by a mere name, such as an epidemic or atmospheric influence, is to stop all further inquiry and investigation either into the cause or remedy. If the seeds of the fungi were not there, the atmospheric influence could not cause them to vegetate; and if, knowing the nature of these fungi, we can destroy them or prevent them from vegetating, there is an end of the disease. Again: That the disease has increased immensely since 1844, gives a very strong natural presumption that it arises from the rapid and more widely diffused propagation of a vegetable fungus, the seeds of which, (spores) according to Professor Morren, are generated in inconceivable numbers." "That there are peculiar circumstances which favor the rapid propagation of particular fungi is certain, and equally certain that there must be circumstances unfavorable to it; and it is to the study and production of these unfavorable circumstances that we have to look for remedies." The writer in the Farmers' Cabinet, whose views we have already quoted as being that the disease is attributable to the deficiency of an alkaline base, has also a paper in the same journal, in which he attempts to show that, if the fungus theory be admitted, his views are still correct, inasmuch as he claims that the cause of fungi is the same defect of alkaline substances. He says: "A chemical analysis of the plants of the fungi tribe will show that they contain an extremely small proportion of alkali—smaller than any other class of vegetables. Upon whatever spot of ground the fungi make their appearance, *there* is a want of alkali," &c. Others are also strongly of the opinion that the evil is of fungus origin, but, as they offer nothing new, it is unnecessary to advert to their opinions.

It may perhaps be inquired, if the disease is fungus, whether, after all, there must not be something peculiar in the season, or the soil, or condi-

tion of the seed, to account for the fact that it should appear so strikingly, just at this time; and, therefore, if the fungus theory is admitted, whether we have pressed the investigation as far as we may, having arrived only at a *proximate* cause, while the cause of this fungus may deserve a further examination. Mr. Webber, of Charlestown, N. H., remarks, in his letter to the office, speaking of the fungus theory, "A supposition of this kind has heretofore been made in this country; but it seems possible that this may be merely a mistake of the effect for the cause. Decaying vegetables are almost uniformly the prey of parasitic or fungus growths. In the economy of Providence, it seems to be a law that there shall be no waste, and that, wherever there is nourishment, there shall be life to consume it and be supported by it, and that the decay of one race shall afford aliment to others. I hardly ever saw a rotten potato without noticing a fungus growth upon it; and potatoes that have rotted in low lands or in the cellar, from becoming water-soaked, presented no obvious appearance to the eye different from those that decayed in the manner under consideration; fungus growth was equally evident in both. Still, the supposition may be true; but other and different observations are wanted to establish it. The death of plants is, indeed, often seemingly, and sometimes probably really, owing to the attacks of insects and parasites; but there seems to be no good reason to suppose that the vegetable kingdom may not be subject to diseases as well as the animal, though the advances made in the study of vegetable physiology have not as yet made us acquainted with them; and the investigation of the subject is by no means as easy. Where so little is known, changes that are apparent are, by the prevailing disposition of the human mind to assign a cause for every thing, laid hold of as causes, though they may be but coincidences, concomitants, or even results; and thus the appearance of parasites, whether of an insect or vegetable nature, upon a decaying plant or tree, are apt to be considered the cause, when, perhaps, they make their appearance only because the tree or plant is unhealthy; and perhaps, at any rate, deriving so much of their nourishment, as plants do, from the atmosphere, and the influences of light, heat, and electricity. In modifying and directing what may be considered their vital actions, it would seem strange if they should not be liable to suffer at times severely from sudden changes of atmospheric influence; and, where so widely spread a destruction as the one in question has taken place, till something more definite can reasonably and philosophically be shown as a probable cause, it would seem as well to look at some such change as the real cause. Such, indeed, has been the opinion of many; hough of the precise nature of that change they are ignorant."

The above remarks, we think, are entitled to attention, and the views expressed coincide much with those we are disposed to entertain in relation to the subject under consideration.

9. The great practical question, however, is, What is the best *remedy* for the wide-spread evil? So far as the knowledge of the cause may aid to suggest the remedy, it is desirable to know respecting its origin. But a remedy may ofttimes be found by experiment, even allowing that the true *theory* of the source of the evil is still unknown. Most of the remedies, however, correspond with some of the views as they have been given above. In some instances, the same remedy having been found efficacious by the advocates of opposite theories, its fitness is accounted for so as to favor their own peculiar views.

There is some considerable diversity, also, respecting the actual utility of

substances supposed to counteract the origin or progress of the disease. Some persons, in one set of circumstances, have tried a remedy and recommended it as sure. Another, however, informs the public that it will not answer. This diversity, it is probable, might often be accounted for by the different condition of the soil, the crop, or the season, &c., in which the experiments are made. We shall pursue the same course we have adopted above, and present the various suggestions which have been made, referring as before to the appendix No. 5, where the papers from which we draw our quotations may usually be found.

The advocates of the *insect* theory recommend a number of articles to prevent or remedy the evil. The editor of the Boston Cultivator, alluding to the opinion of Mr. Burril of Stockbridge, says: "We have understood that house-ashes spread on the hills around the vines after they have grown a few inches from the ground, is not only a remedy for the blight, but greatly facilitates the growth of the potato on some soils." "E. B." of Pompey, whose statement has already been given, speaking of the vines, says: "As a remedy, I cut off the diseased part and destroyed all the flies I could. About 10 o'clock I sprinkled soap-suds upon one small patch, and no flies were found upon it at night, though many were found upon another piece that had not been showered. An hour before sunset I sprinkled the suds left from washing upon the whole." Dr. Stebbins, to guard against the insects he discovered, sprinkled his vines with tobacco liquid, and found it to be an effectual remedy. Mr. Patillo advises the use of sulphur. Those who attribute the disease to any *excess* or *defect* of any *chemical* element, of course recommend the supply or withdrawal of that substance or constituent part. Thus Mr. Croft, who imputes the disease to the want of a sufficient alkaline base, recommends the use of potash, or some other alkali. He says that "an alkali will cure the rot in potatoes in two ways—first by strengthening the cellular tissue, thus preventing the rupturing and consequent disorganizing of the potato, which would result in decay and death; and, secondly, by neutralizing the carbonic acid, and thus destroying the infectious principle." He also alludes to experiments made by Mr. Teschemacher and others, and says, in his letter to this office: "If, therefore, potash be not present in sufficient quantities, we may reasonably expect that the potato will be impeded in its growth, if, indeed, that growth is not totally arrested; if, while the growth is impeded, the supply of carbonic acid be great, and the potato has an opportunity of absorbing it, such carbonic acid, by its infectious properties, will disease the potatoes, (even if there be a comparative drought at the time,) and such disease, if it be not checked, will destroy the potato. Carbonic acid loses this infectious property when it becomes a salt by union with an alkali, and is then rather beneficial than injurious; for if that alkali be potash, the potato plant will assimilate both the potash and the carbonic acid; and, other conditions being equal, the result will be a large and healthy growth." "The foregoing remarks," he adds, "would lead us to suppose that, by supplying the alkalies in sufficient quantities, we should at least save our potatoes from the rot." He then alludes to numerous cases which he quotes from the last report of this office, in which the use of lime, ashes, plaster, &c., is mentioned as having been of great advantage, and claims that his view is thus abundantly sustained by actual experiment. It is unnecessary to do more than refer to the letter itself, in the appendix, for the further elucidation of his views, and

the action of the remedy he proposes. His arguments must be allowed to be ingenious, and perhaps plausible.

For the same reason, adverting to the fungus theory and his own view of fungi, as caused by a deficiency of alkalies, he says: "The fungi being composed principally of carbon, oxygen, and hydrogen, feed upon carbonic acid and water chiefly; and, consequently, if lime or potash be added to the soil where they grow, and the carbonic acid be thereby changed into a salt, the fungi have nothing to feed on, and do not attack the potato. On the other hand, when there is *not* sufficient alkali given to the potato crop to cause the carbonic acid in the potato, is in its own form of carbonic acid, and as such the sickly root offers the proper food for the fungi, and it avails itself of it—then unfortunately for doing so, it brings down upon itself the charge of being the cause of the potato disease."

Mr. Weeks, who holds that the disease is caused by the excess of ammonia being prevented from escaping, urges that "some compost or other substance should be used which will strengthen the stalk, and enable it to elaborate the sap and convey back from the air to the root nutritive elements, so necessary to the hill, in order to preserve the tubers there." We have already quoted the course he adopted in his experiments, which proved successful, of using differently manured land, together with lime; and afterwards, when the plants were out of the ground, salt, unleeched ashes, lime, plaster, &c.

"Philo," of Portland, also believes the disease to come "from an over action in some part of the plant, and a minor action in some other part. And it is very evident that the roots cannot penetrate the hard, unbroken stratum, to obtain moisture." He advises deep ploughing, so that there may be depth enough of earth to allow the descending roots to gather moisture through the season, to act in concert with other roots and the leaves, thereby preserving a healty state of the plant.

The theory suggested by "G. S.," of Pendleton county, S. C., in the Cultivator, of the too great moisture in the tops, is also accompanied by the advice to cut off the tops near the ground, as the appropriate remedy. Another person likewise recommends the cutting off the tops to preserve the tubers before the disease has passed to them from the vines.

The following is the view lately communicated to the New York Farmers' Club, by Nathaniel Sands, of New Windsor, Orange county, New York. He says: "I have found that by planting potatoes as early as possible, I have good crops. The tops perished in August. I let the potatoes lie in the hills till September, and they were perfectly sound. I have seen some disposed to decay, upon which I put lime, and these were saved from further rot. A neighbor of mine had a pond, from which he let the water flow upon his potato field in dry weather. For ten years past he has always had sound potatoes." To prove the efficacy of this watering of his potatoes he had another field which was left dry, and there his potatoes rotted. "The tops of my potatoes totally died in August, but the potatoes kept well in their hills till dug in September. What I call late planting, is late in June. I do not let my planted potatoes be in immediate contact with the manure in the hills. I find that when rain comes and soaks through the soil and manure, the potatoes do better than when in close contact with the manure."

A writer in the Bangor Courier, who writes over the signature of "A Glenburn Farmer," who supposes that the potato had no internal disease,

but was made to rot by an external influence, which he says was *fermentation*, recommends the drying of the potatoes by exposure to the air and sun, &c., as a mode of preventing the spread of the disease. The editor of the Maine Farmer, however, controverts this view, and alleges that if exposed to the sun and air, the tubers will become watery, waxy, and acrid of taste. His view is, that they should be stowed away, with as much sand or soil among them as could conveniently be done.

In the last report mention was made of lime and plaster, ashes and salt, as remedies approved by some persons. We find instances of these as having resulted favorably in the different agricultural journals.

Mr. Teschemacher, in his letter of the 19th of November last, in the New England Farmer, again recommends it. He says: "I think that salt, lime, and several chemical compounds, will destroy the disease. I prefer salt, because, when mixed in the soil, it may get into the juices and circulate through the whole plant. Lime or lime-water would do the same to a certain extent, but it is far less soluble than salt." He then adverts to the fact that salt has been used, and near the seashore, without effect, which he supposes may arise from there not being a sufficiency of saline matter in the sea-weed used, &c. In his letter to the office, already referred to, (and for which see the appendix,) he enters more fully into the question. He says: "The truth is, as respects the application to potatoes dug, is propably that if the disease is already under the skin the salt cannot penetrate, and then, unless the brine were very strong, the moisture of the solution may accelerate the progress; but I do not believe that an entirely untainted potato, if covered with a strong briny solution, will ever receive the disease. The instances where salt has been used in the soil, and the potatoes have escaped, are not unfrequent. After numerous inquiries, I have heard but one solitary exception, where six bushels to the acre had been *harrowed* in, the potatoes had the rot the same as those without salt. I admit that this alone would be fatal to the virtue of the remedy, were it not for one circumstance. I found, on inquiry, that the soil was the stiffest and most unyielding clay, and into this water cannot freely penetrate, much less water thickened with salt; the experiment, therefore, does not prove the use of salt, for, in every probability, it was washed from the surface, or never penetrated to the roots of the potato." There are several instances, he adds, "in which the application of chlorine gas has clearly destroyed the disease; but this application on a large scale is impossible, and, besides, is liable to very dangerous and fatal accidents; but salt is a mixture of chlorine and soda." "Unslacked lime will also destroy this fungus, and must, therefore, be a most excellent addition to the soil, with salt; but lime is not so easily caused to circulate in the juices, except as lime-water. Then the acids in the plant would quickly saturate it and change its nature; in addition to which, it attracts carbonic acid from the atmosphere, and becomes a carbonate of lime, in which state its powers on fungi are very questionable."

With reference to the preparation, &c., of the next year's crop, Mr. Teschemacher further says: "I have given much study and reflection to the subject, and the result is the following recommendation: Let the potatoes intended to be planted be selected with the greatest care, with the fairest and clearest skins; rejecting all such as have small, dark, soft, pustulous looking spots, which are often not larger than the head of a pin; powder them over liberally with fresh quick-lime, and keep them as warm and as dry as possible. It is, however, indispensable that the warm h be a dry heat. The

spot for planting should be a good loamy virgin soil, or a spot that has not been broken up for years, and as dry and well drained as can be had. Do not use any manure, but put in guano if so minded, as it is not possible that the seeds of the fungus can exist in it, whereas manure may be a fertile source of them. Just before planting, plough both lime and salt into the land, then steep the tuber in a strong solution of brine, to which a little bluestone (sulphate of copper) may be added, and commit them to the soil. I have not said anything respecting the quantity, as this must depend on the soil."

We may add here some instances in which salt, lime, &c., have been said to be used, and the effects of them. In the Ohio Cultivator it is stated, from the Akron Democrat, that the Rev. Mr. White, of that place, on removing some potatoes, filled two barrels, one of which had been used for flour and the other for salt, from the same heap, and put them side by side, covered with the same boards. After some time those in the salt barrel were found to be perfectly sound, while those in the flour barrel were all, or nearly all, rotten. "This," says the Ohio Cultivator, "would go to prove what has before been asserted, that salt, in some cases at least, is beneficial in preserving potatoes from the rot after harvesting. Lime also has been found useful for this purpose; but more experiments are needed with both before the question of their utility can be fully settled." Again: "*Lime the medicine for potatoes.*—Two fields of potatoes, side by side, in this village, one dressed with tan-yard manure, in which was considerable lime, received no blight or rot. In the other field, with common barn-yard manure, the tops were early blighted, and a considerable portion of the potatoes rotted."—*Brunswick* (*Me.*) *Pioneer.*

In the New York Farmers' Club, of September 2, 1845, Mr. Thompson, of Astoria, says: "I used lime freely on my potatoes, and they rotted." Mr. Fleet said: "I have remarked many experiments made with lime—some good and others bad." As the potato is an exhausting plant, he did not understand why the second crop should have been larger than the first; but, on looking at the analysis of the potato, thinks it is attributable to the salt; and believed, further, that 20 bushels of unleached ashes to the acre would have increased his crop to 600 bushels per acre. The analysis of the potato, as he quotes it from Professor Johnston, is as follows:

	Roots.	Tops.	Total.
Potash	80.5	327.3	407.8
Soda	46.6	0.3	469.9
Lime	6.6	517.0	523.6
Magnesia	6.5	70.0	76.5
Alumina	1.0	0.2	1.2
Oxide of iron	0.6	0.8	1.4
Silica	1.7	196.0	197.7
Sulphuric acid	10.8	16.8	27.6
Phosphoric acid	8.0	78.3	86.3
Chlorine	3.2	2.0	5.2

In the same club, November 4, 1845, Mr. Colt, of Paterson, writes: "I have cultivated old grounds, and used on them a compost—one of salt, one of lime, one of plaster, and two of wood ashes; and then the same compost, adding one of guano mixed. There was very little difference in the result—rather in favor of bone dust and guano. There was no rot. On new

ground I made use of salt, ashes, and plaster; and on this ground I have the best potatoes, but no rot in either. From this I came perhaps to the wrong conclusion, that salt, lime, and plaster of Paris will prevent the rot." Mr. Hammond, of Conesville, in the April number of the Cultivator for 1845, says: "Lime has been said to be a preventive of rot. It proved *not* to be so in this case. Some coarse lime had been spread on a part of the field. Some hills, where the lime happened to be scattered, were particularly examined, and found to be much more rotted than where nothing was put. Plaster was used in most of the crop. Two rows were left through the field without plaster. No difference could be discovered between these and other rows in the condition of the potatoes." E. V. N. Dox, of Lafayette, in Oneida county, New York, in the February number of the Cultivator, says, in reference to the use of salt for the potato crop: "Three years ago I had a field in excellent heart planted with potatoes, which gave an excellent crop, averaging 300 bushels to the acre. The next year it so happened that it became necessary to plant the same field with potatoes, but I feared lest the worms should destroy the crop, as they appeared quite numerous at the first digging; but I proposed to remedy this by sowing salt, which I did about a fortnight before planting, at the rate of a barrel per acre." He states that he supposed the salt would kill the worm, but it did not. The crop, however, on digging, gave 420 bushels to the acre—far beyond his expectations.

The experiments of Colonel Clark, as stated by him to the New York Farmers' Club, and also in his letter to this office, deserve notice, as showing the success of the remedies he adopted for the diseased potato. He says that he selected a lot which had been rejected as unfit for use. These he divided into 3 parcels. "No 1 was subjected for 12 hours to a weak solution of chloride of lime; No. 2 to a saturated solution of recently burned lime, (quick-lime;) No. 3, in a moist state, was sprinkled over with quick-lime water slacked to dryness. Nos. 1 and 2, after being thus treated, were spread on a brick hearth, and No. 3 was suffered to remain covered partially with dry caustic lime, and all of them so suffered to remain for 6 weeks, when they were examined, and the disease found to have been wholly arrested. The potatoes in Nos. 1 and 3 were somewhat shrunk, probably from the too caustic treatment which they had received; but No. 2, or that which had been steeped for 12 hours in lime-water, were plump and good, and where the diseased portions or blotches came off with the rind." "The parcel from which he took the potatoes on which he experimented," he says, "continued to perish, and were finally thrown away as worthless." He adds: "Exposure to the atmosphere, in a dry place, may have had a beneficial effect; but as the disease is, beyond doubt, occasioned by *fungi* of a very delicate texture, these were destroyed or decomposed by the acrid substances to which they were exposed. If mistaken in the character of the disease, and it should ultimately be found to result from the depredations of animalculæ, the cure may be ascribed to the same cause. The results of my experiments induce me to believe that the absence of a sufficient quantity of limestone (carbonate or phosphate of lime) in soils, is the cause of the disease in the potato. If it be owing to other cause or causes, the remedy indicated, it seems to me, is the free use of lime-water made from lime slacked to dryness, or of unbleached ashes, at the planting or first dressing season of the potato; and I suggest to farmers, who may have been sufferers from this wide-spread pestilence in their crops, to try whether

a judicious use of these materials may not prove a corrective for or a prevention of this disease."

We have thus presented the substance of the accounts before us, as relates to the appearance of the potato crop of our country, and the views entertained respecting the cause and remedy of the so-called potato rot. We do not feel sufficiently satisfied, from this examination, to offer any decided opinion as to the cause or origin of the evil. There are, however, some deductions which we think we are authorized to make, and which may serve to embody the results of our somewhat extended consideration of the foregoing particulars.

1st. That all the detailed appearances cannot be considered as legitimate effects of any *one* cause.

2d. That *many* of them are *merely accidental*, and that their presence or absence would prove nothing as to the nature of the cause of that evil with which they are associated.

3d. That we have reason to believe that the *cause itself*, and its *mode of development*, have often *been confounded* together, or mistaken one for the other.

4th. That there is great reason to doubt whether the *immediate* effects of the latent cause have been so far subject of observation, that an accurate and sure opinion can be formed respecting it.

5th. That, whatever be the cause, there are different *stages* of its development—*degrees* of its power; and that these depend on a variety of adaptations in the circumstances of the crop.

6th. That the *rapidity* of *development* also corresponds with the aid derived from extraneous circumstances; and hence some, if not all of the evil results may be remedied.

7th. That it is doubtful whether any remedy suggested has been sufficiently tried to enable us to pronounce it a *certain* or *sure* one.

8th. That it is important to study more accurately the influence of *soil*, *seed*, *culture*, *temperature*, and *condition of the atmosphere* on this crop; and that it is only by a series of careful and discriminating observations that we can clearly decide on the probable origin and most fitting remedy.

9th. That many of the preventives or *checks* recommended have, in their favor, so good proof of a *degree* of efficacy, that, till better are discovered, they may be safely adopted, suitable regard being had to the similar or different circumstances of their application.

We believe there has been, as usual, injury sustained to the potato crop of the United States by the prevalence of ordinary and common causes, such as must be expected, more or less, every year. We do not doubt, also, that there has been an extraordinary loss of this valuable product; but whether it be owing to some before known cause, which, from the peculiarity of the season or some unknown circumstances, has exerted an unusual influence, and thus a new development, or to some hitherto unexperienced cause till within a short period past, we cannot say. Whatever it is, its progress is not yet fully traced, and it is only till more light shall be shed on the subject that we can confidently pronounce in favor of any one theory; and it seems probable that there is a combination of the views that have been suggested necessary, in order to account for its various phases, as we cannot resolve all the great features into one, entirely independent of all others. It so happens, however, that we have it in our power to make a comparison

as to the aspect of the evil among ourselves, and in those countries where it has prevailed.

The prevalence of the evil in Great Britain and on parts of the continent, during the past season, has led to numerous statements or accounts respecting the appearance of the vines and the tubers, and occasioned considerable diversity of sentiment even among the learned and scientific, as well as the simple practical farmer, respecting the origin and cause, and the best method of treating it. The supposed causes, however, are much less in number than in our country, at least so far as we have been able to ascertain them. We have seen scarcely any attempt to trace the evil to insects; but nearly all writers seem either to consider it atmospheric, from over-cultivation, deterioration, or fungus. It is called by a variety of names, as the potato blight, rot, disease, gangrene, cholera, murrain, &c. The usual name is the *blight*, or *rot*. The appearances of the vine and the tuber are generally described in very similar terms, and these correspond nearly to the same already heretofore given in this country. It seems to be thought that traces of it have been heretofore seen in some places, but these were not sufficient to excite particular notice till within the last season.

The *earliest* mention we find of its appearance in our English periodicals was in the Isle of Wight, and the Isle of Jersey. This was about the 11th or 12th of August last; and perhaps somewhat earlier, for we find some difficulty in fixing its precise date. It is noticed by a correspondent from the Isle of Wight, but with no date of time, in the London Gardener's Chronicle of August 16; another from the Isle of Jersey, in the same paper, of August 23; and also by another in the Isle of Guernsey, in the Mark Lane Express, of August 25, 1845. From the southern part of England, it rapidly passed through Devon, Cornwall, Sussex, and Norfolk, towards the north, and finally, in the course of two or three weeks, we learn of its ravages as having commenced in Ireland and various other parts of the Kingdom. It may be useful to quote from the description thus early given of the appearances. Dr. T. Bell Salter, of the Isle of Wight, in a letter to the London Gardener's Chronicle, edited by Prof. Lindley, says: "A blight of unusual character, which almost universally affects the potatoes in this island, having been, within the last few days, repeatedly brought to my notice," &c.—he then goes on to describe the appearances, as follows: "The first appearance is a dark spot on the margin of the leaf, which withers the leaf and spreads rapidly to the stem. The discoloration soon extends along the stem, in the course of the vessels, and the whole plant rapidly becomes black; so that within the course of three days after a plant has been attacked, it has become totally destroyed. With this appearance in the upper part, there co-exists a fatal change in the tubers; they become likewise spotted at first near the eyes, on the upper surface; the cuticle separates, the substance becomes friable, and the change soon spreads through the whole potato. All situations, high or low, and whatever the nature of the soil, appear to be equally visited. The attack on the plant appears invariably to commence in the leaf, and not in the stem; and the spot commences at the margin, corrugating the leaf as it spreads. It is black on the upper surface; but on the lower surface, though black in the centre, it is whitish or gray on the margin, but neither minute insects nor fungi can be seen with a strong lens. That, as regards the green portion, the leaf is affected before the stems, I am quite clear; but the question arises, is the disease in the root and tuber the cause or consequence

of the above change?" He supposes it to be the consequence, especially from one case, where, from ripeness, the green leaves were on the point of withering when attacked. The affection did not at all extend to the roots.

He next describes the change in the tuber, and says: "The first appearance much resembles a severe burn, the root turning gray or ash-colored, and the cuticle coming off. The taste is pungent and nauseous as the disease advances." Another writer says: "I yesterday saw a piece of potatoes that look as if they had all been scorched, although but two days before they were looking as healthy as need be. They become attacked with small brown spots, and in less than forty eight hours they are quite burnt up, and the smell arising from them is most disagreeable. The potatoes, when cut into, have the appearance of being frost-bitten," &c. In the Chronicle of August 23, Richard Gifford writes from Jersey that the disease appeared there about three weeks before—about August 1st; that the places most affected were under the hedges and in the coldest part of the fields. Another writer in the same paper says: "The centre of the plots has been first affected;" that "the haulm smells remarkably like new-made hay, and the whole mischief above ground is done in three or four days." Another writer mentions that in one night the leaves of potatoes had turned as if struck by frost." A correspondent, also, of the Mark Lane Express of August 25, writing from Guernsey, under date of August 16, says: "Up to Monday last, August 11, the promise was for the most abundant crop ever known; the whole looked healthy; in one night the mischief was done—the whole of the stalk and leaf turned as black as your hat, and the potatoes rotted in the ground." Other particulars, mentioned by different writers, are, that only a small portion of the potato was affected in some two or three places; roots fair to the eye when boiled, were as if frost-bitten, and were uneatable; tubers nearest the surface affected. In Sussex, "first appearance in low and cold situations; then hills and slopes; the site of an old stone pit, on high ground, clearly traceable in a large field by first appearance of disease and decay of potatoes." In Folkestone "the most perfect drainage does not cure, but accelerates the evil." In some cases the early potatoes were the most affected; but in St. Helier, Jersey, the attack is said to have taken place about the 4th or 5th of August; the barometer was very low, and had been so for some time; the electric matter also filled the air from the 22d July, without thunder; early and late potatoes were equally affected; the places where they were most affected last year suffered a month earlier this year." From others, also, we learn that the sound potatoes are most remote from the haulm, and bad ones just at the bottom of it, the ends being attached to the haulms." Mr. T. P. Elliot mentions, before the disease was announced in a part of Ireland, that there had been a disease there for three or four years past which had done much mischief; "instead of commencing above ground, it seems to commence with the decay of the old set." The editor says that it is "only a mild form of the murrain." In Cornwall a writer mentions, "in the early part of the preceding summer we had two, and only two, excessively hot days. The heat was intense; it came on suddenly and lasted only forty eight hours;" a crop of potatoes was noticed the day before this accession of heat as thriving and in perfect health; they were of recent growth, and the stalks had not sprouted. On being visited after the hot days, the plants had all made very long shoots of leafless stalks, and this rapid growth had taken place in forty eight hours. On the fall of the temperature the plants became sickly, and were soon blighted. Another writer says, that in June, when digging up early pota-

toes, before there had been any appearance of disease even in the haulm, "there were left on the surface, fully exposed to the weather, sixteen potatoes, twelve of which are now found to be infected, the most exposed portion of the tuber being the worst." Another writer states that the disease was "first established by means of the haulm on that end of the potato, which henceforth assumes a darker color, at first, for a week or two, merely on the surface; this, by degrees, spreads to the eye end of the potato; and it is when established there, that the chief work of destruction occurs. Shortly after this the character of bruised flesh appears," &c. "I have not a doubt on my mind that this mildew commences with the leaf, like other mildews; and breaking up the tissue there, which is extremely delicate and watery, compared with other mildew subjects, induces the gangrene, which, finding a proper nidus all the way down the stem, descends rapidly through the stem into the potato, the cellular tissue of which, in the interior, affords as ready a facility for the spread of it." Another writer mentions that clay soils escaped best, but that in the porous green-sand formation it proved the worst. Another still says that sward potatoes are best. Another writer, in the Mark Lane Express, describes the aspect of the potato as follows: "The disease apparently attacks the plants in the fibrillæ of the roots, and where the root passes into the tuber or solid bulb of the potato. An interruption having taken place between the supply and the demand of the living plant by the decay of the root and its fibrillæ, its stalk quickly droops and withers in proportion to the progress of the malady. The thin outer coat of the potato may now be perceived roughened and thickened in one or more patches, and these, when cut through, show that the internal structure of the tuber is altered, the change commencing immediately beneath the cuticle or outer skin; the pulp is changed to a rusty brown color, like a bruised apple, in thickness varying with the intensity and duration of the disease; eventually the structure of the whole potato is converted into a reddish brown, half rotten mass."

In some parts of Ireland, great complaint is also made of the intolerable effluvia proceeding from the fields, so that persons could with difficulty be obtained to dig the potatoes. In some parts of the country, the strong soils are noticed as being much the most affected; while the potatoes on the lighter ones escape with less damage.

Such are some of the accounts which are given of the potato rot in Great Britain; and we think that, comparing the descriptions with those which were given in 1844, and during the last season of the disease prevalent in this country, we can scarcely entertain a doubt that it is of the same nature with that which has occasioned so much alarm among our own farmers and the community generally where the crop is considered an important one. It is therefore desirable to know what are the views of scientific and practical men in Great Britain as to its nature and origin, as well as the remedies best adapted to prevent its future appearance and progress. We are favorably circumstanced in this respect, as we are enabled to refer to the opinions of such men as Professors Lindley, Lyon, Playfair, Johnston, Buckland, as well as many practical and observing farmers and gardeners. The English papers are full of communications on the subject, but we shall confine ourselves principally to those which we find in the agricultural papers of high standing, and we have thrown in an appendix (No. 6) a variety of extracts, which we have quoted for the purpose of presenting the view here given of the disease in that country. The *theory* most generally

adopted by the scientific men of Great Britain is that which attributes the disease mainly to the *peculiarities of the season.* Some appear, however, to adopt that of the fungus; and others ascribe the evil to over cultivation and deterioration of the seed, &c.

On the first announcement of the disease, Prof. Lindley, editor of the Gardener's Chronicle, gives the following statement of his views: "The cause of this calamity is, we think, clearly traceable to the season. During all the first weeks of August, the temperature has been cold from two to three degrees below the average; we have had incessant rain and no sunshine. The potato absorbs a very large quantity of water; its whole construction is framed with a view of its doing so; and its broad succulent leaves are provided in order to enable it to part with this water. But a low temperature is unfavorable to the motion of the fluids, or to the action of the cells of the plant; and, moreover, sunlight is required in order to enable the water sent into the leaves to be perspired. In feeble light, the amount of perspiration from a plant is comparatively small; in bright sunshine it is copious; in fact, the amount of perspiration is in exact proportion to the quantity of light that falls upon a leaf, &c. During the present season, all this important class of functions has been deranged. The potatoes have been compelled to absorb an unusual quantity of water, the lowness of temperature has prevented their digesting it, and the absence of sunlight has rendered it impossible for them to get rid of it by perspiration. Under these circumstances, it necessarily stagnated in their interior, and the inevitable result of that was rot. If the first days of July had not been suddenly hot, it would not have happened; if we had had sunlight with rain, it would not have happened; and perhaps it would not have occurred had the temperature been high instead of low, even although the sun did not shine, and rain fell incessantly. It is the combination of untoward circumstances that has produced the mischief. Although we first see the symptoms of the disease in the leaves, and then in the haulm, yet we believe that it commences under ground, in that part of the haulm which is just above the old set; there, water collects the most; there the temperature is the lowest, and there the old set itself, acting like a sponge, and itself decaying, feeds the live stem with semi putrid matter."

In answer to the objection that potatoes thrive very well when summers are usually unfavorable, as the last, he says: "The potato then grows slowly; its tissue becomes thoroughly organized as it proceeds, and it is not liable to be acted on by accumulated moisture; no predisposing cause exists. But in England the potato was predisposed to take the disease, by the unusual warmth of the beginning of July, suddenly succeeding a period of cold ungenial weather. The potatoes grew very fast; their tissue was soft and unconsolidated, filled with azotized matter, as all such tissue always is, and peculiarly liable to run into a state of rottenness." Again, in the next week he repeats the view, and his belief that the cause is excessive wet and a low temperature acting upon the debilitated organization of a haulm, which sudden warmth has forced into preternatural vigor. Alluding to the idea that the spot on the leaf is the cause, that it is cold or some other thing acting on the foliage, that has caused a disease which spreads downwards, he adds: "If we may be certain of anything when considering the obscure phenomena connected with vegetable disease, we may be certain that this is not so. The evil always begins next the old set, and under ground; then the haulm becomes brown, and rots; the spots in the leaves

are merely the symptoms of the underground malady." He also states that cucumbers and gourds are similarly affected; and others, too, as we may here say, mention the same disease as reaching dahlias, onions, turnips, and carrots.

Again, in his next number of the Chronicle, alluding to the attacks of a kind of mould mentioned by a correspondent, he says: "This is only what was to be expected; for as soon as living matter loses its force, as soon as diminished vitality takes the place of accustomed vigor, all sorts of parasites acquire power, and contend for its destruction." He subsequently renews his declaration of confidence in his original opinion, and states a similar view to be taken among the Belgian cultivators, with the exception of Professor Morren, and says: "It is true, that a minute fungus has made matters infinitely worse; but that is, we quite believe, a *secondary* cause."

In the report of the Irish commissioners to examine into the disease in Ireland, &c., of which Professors Lindley and Playfair composed the majority, they attribute the cause to the season, and say: "Without pretending to decide what that cause really was, we may state that it seems to be connected with the cold, cloudy, ungenial weather which has characterized the present year over the north of Europe—conditions highly unsuited to the constitution of a plant which, like the potato, is a native of a warm, dry, sunny country, and insufficient for the ripening of the tubers. Without adverting to the solitary cases which require to be examined with more care than we have the means of giving to them, we may state, that amidst the mass of conflicting evidence which we have obtained, the following facts appear to be established: 1. That potatoes planted early in the season are more healthy than those planted later. 2. That the crop has suffered less in dry, elevated, sandy districts, where the influence of the season was mitigated by the slowness of growth, as compensated for by the natural warmth of the soil. 3. That the late varieties of potatoes are more diseased than the early ones. 4. That the present disease seems to be confined to the northern parts of Europe and North America, and to be unknown in the countries to the southward."

Another writer, who also attributes the evil to the season, says that in certain states of the weather the potato will become subject to morbid formations; and these, unless means are adopted to prevent their development, will soon show themselves by that corruption or rottenness which during the present season has been so prevalent. This disease sustains, then, the same relation to the potato as scrofula to the human species; it may be considered as partly resulting from constitutional defect, and partly from external causes.

Another, still, says: "Having examined the tubers infected with the prevailing disease, I have scarcely a doubt left upon my mind that it is that moist ulceration, *gangrena saniosa*, to which all bulbs and tubers are liable if exposed to ungenial circumstances at the time when their ripening processes should commence. He instances the cases of the tulip and hyacinth. At an agricultural club in Hadleigh, after a full discussion, it was resolved that "the failure is entirely owing to the season having been unsuited to fully perfecting the tubers of most of the varieties of the potato." Mr. Teschemacher, in his letter to this office, objects to the views of the British professors above stated, from the fact that the disease has prevailed here in a warm dry summer, and that, though we have had many cold, cloudy summers before, we did not suffer from the disease.

Some in Great Britain are strongly of the opinion that the seed has been injured by *cutting*, and otherwise deteriorated by *over cultivation.* One person says, that, "from its earliest appearance having been in the southern parts of the island, and the early sorts suffering most, it would seem that the mildew requires an elaborated state of the sap in the plant to facilitate its progress, as is the case with the pea mildew." It is suggested by another, that the disease is the result of the chemical changes necessary for the formation of starch, albumen, and other inorganic products, not having been produced in the proportions necessary for assimilation. It would appear that the peculiarity of the weather the past season has been so great as to cause almost every one to fix upon this as the *primary* cause of the evil. Thus, from Scotland, one person says: "This year the potato crop suffered severely from the cloudy and extremely cold and wet season—the temperature, especially in high districts, frequently bordering on frosts so early as from the latter end of July to the end of August, and subsequently." Again, in Peebleshire: "From the general nature of the disease, there can be no doubt whatever that it is produced from some general cause; and, without hesitation, we attribute it to the cold, wet, and ungenial season. We find, by taking a potato of the soundest description, and allowing it to remain for two or three days amongst earth over saturated with water, that the same disease is produced which is now so prevalent over all Scotland. Until such a time as we began to raise new varieties from seed apples, such a thing as failure or disease was never once heard of; and to the result of this experiment we in no small degree attribute the deterioration of the late potatoes."

A communication from Tweedside, in the Mark Lane Express of November 24, offers the following suggestions in favor of the view that the disease was in consequence of the peculiarities of the season: "During almost the whole of the time that the young potato was swelling into size and advancing into ripeness, the quantity of wet in the ground and the absence of sunshine were peculiar; and these, operating upon the potato in the tender stage of its growth, I am convinced are the causes of the disease by which it has been affected. I am led to this conviction by the following circumstances: 1st. In narrowly watching the taking up of potatoes grown in a dry deep loam, upon a sandy sub soil, I observed that those which were placed in a horizontal circle round the stem and near the surface, or partially bare, were not affected at all. 2d. Where the plants had occasionally penetrated deeper into the soil, and had produced one or more potatoes at the depth of eight or ten inches from the surface, those at that depth were invariably affected, while those placed nearer to the surface, and attached to the same stem, were free of disease. 3d. In thin turfy soils, or thin adhesive clay, upon an impervious stratum, the potatoes were necessarily placed in a position where the wet was lodged between the soil and sub-soil, and these I invariably found to be affected. 4th. In these soils potatoes lying close to the surface, or uncovered, were generally sound."

Erasmus Wilson, F. R. S, in a letter to the editor of the London Times, of September 23, gives the following opinion of the condition as well as the cause of the rot in potatoes. He says: "The real cause of the destructive changes at present taking place appears to be the *unripeness of the tuber*, and the consequent *imperfect elaboration of its juices.* When examined with the microscope, the cells of the potato are found to be not more than half filled with starch cells, (many of which are incomplete;) the

remaining portion of the cell being filled with water. Hence the actual condition of the potato may be stated as follows: 1st. Deficiency of starch; 2d. Imperfection in the tissue of the cell walls; and, 3d. Excess of water; to which may possibly be added, imperfectly elaborated starch. As a consequence of the imperfection of the tissue of the cell walls, and its state of maceration in a superabundance of water, it falls speedily into decay; the change beginning at the surface and proceeding inwards, and being indicated by a brown discoloration of the cells. The starch cells, which are at first unaffected, are soon enclosed in the decayed cellular tissue, and, becoming involved in the decay, are thereby destroyed."

Mr. Crossthwait, in the Mark Lane Express, of December 8, supposes the disease to have arisen from *excess of moisture* in the tuber. He says that he believes the redundant fluids of the potato press towards the outer rim, and not finding a vent, the disease commences, like a bruise, round the rim, or in the weakest part of the potato. His remedy is to cut the tuber across, and thus allow the superfluous moisture to escape, and the disease is arrested. In proof of this, he alleges some experiments made by him, and which he found to be successful. Those potatoes, also, which were accidentally cut by the spade while they were dug, almost entirely escaped. He likewise recommends that all the small potatoes be saved for seed, as they have been the soundest the last season. "They should be closer set than large ones."

A singular fact is mentioned by Mr. George Juler, of North Waltham, in a note to the editor of the Norfolk News. He says that "a person there last spring left a potato by accident in the corner of a closet in his house, which, in October, was found with seven small potatoes attached to it, and five out of the seven were spotted with the murrain."

The view which attributes the evil to a *parasitic fungus* has also its advocates in Great Britain, and some of these are among the ablest men of science. The following, from the Rev. Mr. Berkley, pronounced by Professors Lindley, Playfair, and Kane as the ablest naturalist in his knowledge of the habits of the fungi in the Kingdom, presents this view of the cause as first stated there. After having said that he could not hear of it as prevailing in his neighborhood, he writes: "I have this morning received from Dr. Montague, of Paris, some leaves affected with the mildew, together with an admirable analysis of it, and it proves to be a minute mould of the genus *Botrytis*, very greatly resembling that which is so common on the 'shepherd's purse,' especially on those plants which are attacked by the white *uredo*. It is also allied to *Botrytis destructor*, which is occasionally a perfect pest among the different species of Allium. I have seen whole beds of shallots entirely destroyed by it, and it is occasionally very prejudicial to onions. The parasite of the potato does not appear to have been before observed by systematists, and differs from those of the same genus, in several respects, which have long been known as attacking the leaves of various plants. Dr. Montague proposes to call it *Botrytis infestans*," &c. "He does not undertake to say that the spots on the tuber are owing to the ravages of the Botrytis, or whether the two causes of disease co-exist. The *primary* cause is doubtless the continued wet, combined with certain peculiarities of the soil. It may be observed, that the dry rot in potatoes, so ably described by Martius, arose from the attack of a fungus of a very different structure from that by which the leaves and stems are attacked in the present instance."

Again: The next week the same gentleman writes, in the Gardener's Chronicle of September 6, announcing the appearance of the disease, and says: "I do not find that the tubers are at present affected, but the haulm is decaying very rapidly, and in every case the blighted spots are covered with *Botrytis infestans*, (Mont.") He then states that the mould sent to him by Professor Lindley is identical with that on leaves, and the same kind as that he had received from Paris. He adds: "On making a very fine vertical section through the less diseased portions of the tubers, I find incipient plants of the mould in the more healthy cells; for, in general, the brown spots do not at first consist entirely of decayed cells, but still retain many in a tolerably healthy state. At a later period, probably all the cells would be more or less altered. Those which are uncolored exhibit their usual appearance; but the walls of the diseased cells are thickened, and have a granulated appearance. Both in the colored and discolored cells the grains of fecula remain unaltered, and are as sensible to the effect of iodine as ever. It is probable, therefore, that, at least in an early stage of the disease, the tubers would yield as good starch as those which are sound. There is not the slightest appearance of any processes upon the grains of fecula, as in the disease so admirably illustrated by Martius. It is the cellular tissue alone which seems to be affected. The cells immediately beneath the cuticle, especially where there is a depressed spot externally, are often affected with the mycellium to such a degree that the pure white of the mycellium predominates, and the brown tint in a great measure vanishes. Even in this case I find the grains of the fecula healthy and abundant. It appears, then, that the decay of the tuber is produced by the same cause which affects the leaves, to wit: by the growth of a mould, the development of which has been promoted by the excessive wet. The parasite does not appear to have been observed before; but there is little doubt that it will now be found to be more or less prevalent in damp and ill drained spots, in the driest years." Mr. Berkley again writes to Professor Lindley, in the Chronicle of September 20—"I have received from Dr. Montague specimens of a very curious parasite, which occurs in the intercellular passages of potatoes during the process of germination, and just after it has been completed. It was discovered in the course of some experiments made by Dr. Rayer, chief physician of the Hospital de la Charité, at Paris, who has been paying great attention to the disease which now infects potatoes. Amongst other points he finds, that, though the grains of fecula which are found in the cells of diseased potatoes are not injured, they gradually diminish in number, as in the germinating sets, till in some cases all are completely absorbed." "Dr. Montague considers the parasite above mentioned to belong to a new genus, allied to *lepedonium* and *asterophora*. He has given the little mould the name of *artotrogus hydrosporus*." Mr. Berkley still further adds: "In every case I find the *Botrytis infestans* preceding the work of destruction. It appears that while the leaves are yet green or yellowish green, the parts attacked soon become brown and withered. The appearances shown convince me that the spots on the tubers arise from the attack of the mould, and that mould is not an after organization. The most form distinct concentric circles, disposed in one or sometimes two systems, exactly as in *Oidium fructigenum*, as figured by Ehrenberg in his *Mycetogenesis*, and as may be seen almost every autumn on fallen pears and apples. In re examining specimens in which there was no external appearance of mould, I found that the spawn was very evident

in the diseased cells; but, as I before observed, the grains of starch were sound and unaffected. Some of the cells contained little cubical colorless or brownish crystals, which I had not previously met with. If the infected tubers are shut up for a day in a tin box, the mould will appear externally in little white patches, and soon fructifies."

Another writer, at a later date, also advocates the fungus theory partially, and says: "The cold and wet during the last summer have no doubt been the principal agents in fostering the murrain, rendering the potatoes predisposed to generate the fungi which now infect them, and which are probably of spontaneous growth; more attributable to the condition of the potato being favorable to their growth, than the fungi being the primary cause of all the mischief. On opening many potatoes which presented no outward appearance of being affected, I found many wherein decay had already extended about a quarter of an inch below the surface without breaking through the skin, leading me to suppose that, although the fungi increase the malady to a fearful extent, they are in the first instance caused by the unhealthy state of the potatoes, consequent upon atmospheric influence and improper cultivation. On examination, I have also found some bladder like spots on a few potatoes, which, when broken, contained innumerable fungi, tending rather to confirm me in my statement of spontaneous production." Professors Lindley, Playfair, and Kane, as the commission appointed to examine and report upon the condition of the potato crop in Ireland, observe respecting the fungus theory: "It is a very general opinion, and one entertained by men whose extensive knowledge entitles it to respect, that parasitical fungi, similar in their nature to those which produce mildew and dry rot, are the real cause of the malady," &c. They then go on to describe the conditions under which it is supposed the fungus appears, and which it is unnecessary to repeat, as the whole report may be seen in the appendix No. 6. But, say they, "that the spawn of fungi is present in large quantities in diseased potatoes, is undoubted. The evidence of the best microscopical observers would be with us conclusive on this point, even if we had not verified the fact by personal examination. We also regard it as well ascertained that these parasites spread rapidly in damp and warm situations, producing infinite mischief under such circumstances, and that their advance is only to be successfully resisted by dryness. But it does not appear to us that their being the original cause of the disease has been well established. If it were so, it is difficult to conceive why fields of potatoes placed very near to each other should be differently affected, or why certain varieties of this plant should be much more injured than others: the Irish apple potato, for example, which appears to have suffered much more extensively than any other. We are also unable to reconcile with the theory of the disease being caused by parasitical fungi, the remarkable fact that, in its present form, it is certainly of modern origin. That it may have always existed is possible, though of this we have no proof; but at least there can be no doubt that it has only manifested itself to any considerable degree within the last few years. We cannot suppose the *botrytis*, which observers find to be the kind of fungus that attacks the potatoes, to be of recent origin or creation. We must assume it to be co-existent with the potato itself, and therefore we must conclude that some recent causes have come into operation favorable to its increase to the present alarming degree."

In some of the numerous works which have been called from the press by the potato disease the fungus theory is adopted, and in others it is dis-

puted. Mr. Buckman says that "the fungi resemble those which produce smut in barley." He finds their seeds in great numbers on the sides of the cells. He calls it *uredo tuberosum*. He regards it, however, not as the cause, but the *effect*, attributable to the peculiar season.

Mr. G. Phillips, another writer on the subject, says that he is unable to find fungi. He imputes the evil to too much moisture, the effect of long continued rains—stimulating the plant beyond its ability, and then overpowering it.

Such are the statements of different individuals distinguished for science and habits of observation, in Great Britain, respecting the *cause* of the evil and its *appearance*.

Before we pass on to the *remedies* that have been suggested, we may as well glance at the opinions held on the continent upon the same subject. Professor Morren, of Belgium, where the disease was very destructive, broached there the fungus theory. His views may be gathered from a statement which we find translated from him in one of the public journals. It says: "Mr. Morren, after stating that the evil had prevailed in Belgium for several years, though to a far less alarming degree than at present, proceeds: 'The real cause of the evil is a fungus or sort of mushroom, which the learned will classify under the genus *botrydis*, but which agriculturists, without further specification, will call a spot, a blemish, or blotches. * * * * * This mushroom is of extreme tenuity, but it breeds amazingly and reproduces itself by thousands. Its stems are formed of little straight, hollow threads, which bear on their summits one or more branches, always divided into two, and at the end of these branches reproductive bodies are found, which have the form of eggs, but which are scarcely the one-hundredth part of millimetre in size. It will be said that this is a very small body to do so much mischief, but I answer that the itch is not a disease less to be feared because the *acare* which produces it can be seen only by the aid of the microscope. After the formation of the yellow spot, and the development of the botrydis on the leaf of the potato, the stalk receives the deleterious influence. Here and there its epidermis turns brown, blackens, and, following with the microscope the phases of the evil, you perceive that it is by the rind that the stalk is attacked. The morbid agent carries its action from the rind on the epidermis; and, although this last does not always disclose mushrooms, it is not the less for that struck with death. The infection soon descends into the tubercle itself. If the disease follows its course, the tubercle mortifies forthwith. A potato is not a root, but a real branch, whence it follows that a tubercle contains a marrow, which is the eatable part to be preferred, and a separate rind; between the marrow and the rind there is a zone of vessels which represent wood. This construction will be apparent to any one who chooses to cut a thin slice of potato and place it between his eye and the daylight. The infection attacks that part which receives the sap on its descent. By following the progress of the evil upon a great number of tainted tubercles, I have been able to see how the evil, by one continuous progress, at length reaches the heart itself of the potato and corrupts the vegetable entirely. The skin of the diseased potato comes off easily; the flesh no longer cracks under the knife; a flatulent liquid drips from the potato; a musty, and presently an animal smell, analogous to the smell of mushrooms recently cut, manifests itself, and occasions considerable nausea. * * * * * The evil being traced to its source, the cultivator must direct all his attention to the destruction

of the fungus or mushroom, for it is unfortunately but too true that all the parasites of this genus once introduced into a country remain there and propagate. This year the epidemic has been general; the germs exist every where; millions upon millions of propagules, if their number is not diminished this year, will next year be attacking the plants, and then it will be more difficult to eradicate the scourge.' "

The French naturalists, however, do not generally agree with Professor Morren. The correspondent of the National Intelligencer states that, "at a late meeting of the Academy of Sciences, M. Decaisne, of the Garden of Plants, who had examined, in every way, a number of diseased potatoes from Holland and the neighborhood of Paris, disputed the opinion of the Belgian Professor Morren concerning the cause or proximate agent of the malady. He seemed to convince the Academy that the parasite mushroom of the Professor is one of the *products*, and not the *cause* of the evil. It was stated that the human epidemic which ravaged Germany in 1816 and 1817, was chiefly owing to the habitual consumption of diseased potatoes. In the *Comptes Rendus*, Nos. 13 to 16, 1845, M. Payen gives the result of his chemical investigation: "The dry matter, which is all except water, is lessened 12 per cent. The diseased part is twice as heavy as the healthy part. This he attributes to a parasite. The loss of starch amounts to 20 per cent. There is also azotised matter of the same composition as the fungi. Messrs. Girardin and Bidard, however, deny that these are parasites. They say that there are none indicated except such as are found in all cases of fermentation. They regard the disease, therefore, as the result of simple fermentation, induced by the unfavorable season. M. Durand also attributes it to the atmospheric causes, favored by local circumstances. M. Gerard adverted to the fact that the disease attacked the potatoes between the 10th and 15th of August. He is opposed to the idea that either animal or vegetable parasitism is connected with it as a cause, and he ascribes the disease to the presence of a brown matter which seems to glue the starch grains together and to prevent their separation. He attributes its presence to unfavorable atmospheric causes, which caused the nutritive fluids to stagnate, and thus produced an alteration which ended in decay."

The *extent* of the disease in the north of France, according to a Rouen journal, was one-fifth of the whole crop. It is supposed, it is said, that the cold nights and rain have caused it. The nature of the soil or kind of seed did not seem to alter the case. In French Flanders and Belgium, also, the evil was greatly felt. Accounts from Stenay, on the Meuse, state that it has extended to that country. In Prussia, also, a German professor there writes, says the Gardener's Chronicle—"As regards the potato epidemic, it is only partial here, and confined to the early kinds in heavy clay lands. In Bavaria mention of it is made, and it is said to be distinguished from the disease in 1842, by the rapidity with which the infected potatoes run into a state of putrefaction, by the *absence of any evident fungus*, *spawn*, or *mycelium*, and by the obliteration of the membrane of the cells before any diseased action is visible in the starch grains. I am," says he, "perfectly satisfied that it is the *extraordinary season*, combined with the negligence of our cultivators, and their bad treatment of the plant, that has caused it to be visited with this calamity. I cannot believe that any parasitical fungus has produced any such mischief."

"A letter from Berlin," says the Gardener's Chronicle, "states that, by means of the microscope, the cause of the malady prevalent in the potato

has been discovered to be *insects* of an exceedingly small species. They create cavities in the tubercle, and soon produce putrefaction. Lithographic drawings have been made of the diseased parts of the vegetable, and of the insects alluded to, and copies have been sent to the principal agriculturists."

The disease is likewise described as spreading more and more in Denmark and Sweden. The Cologne Gazette states that nearly the whole growth of potatoes in the Rhenish province is lost. In Holland, according to the official report of the agricultural society of Groningen, the malady is to be ascribed to the heavy rains of 1844, in the summer, and to the weather which prevailed just at the time the tubercle seeds were formed, and partly to the carelessness of agriculturists in keeping the potatoes intended for planting perfectly dry. It is thought, too, that the excessive cold of last March proved very injurious. As more direct causes, are stated—1st, the too rapid growth of plants this year; 2d, the excessive heat which prevailed in the early part of the summer of the present year—being, on the 13th of June, 87° Fah., on the 3d of July, 87½°, and on the 7th of the same month, 91½°—3d, the rain which fell at intervals, and which subjected the plants, as it were, to the action of warm water; 4th, the cold and moist temperature which succeeded from the 15th of July to the end of August; 5th, the existence in several places of an extraordinary fog, which, in several places, emitted a disagreeable odor. They attribute much to this miasma. In the province of Groningen it was clearly ascertained that the infection proceeded from the leaves and the stalk to the root, and that it was displayed by small stains, and by the existence of a species of mushroom, placed by some writers under the head *Fusisporum solani*. No traces of these parasites were discovered in the stalks or the tubercles; a fact considered as proof that the disease was first propagated from the leaves, and consequently that it differs essentially from those murrains which originate in the roots. We maintain, say the committee, "that this disease has probably existed before, more or less; but that it is one which hitherto has not been described by naturalists." The whole report may be found in appendix No. 6.

Prof. Liebig's opinion of the disease is as follows: "The researches I have undertaken upon the sound and diseased potatoes of the present year, have disclosed to me the remarkable fact that they contain in the sap a considerable quantity of vegetable casein, (cheese,) precipitable by acids. This constituent I did not observe in my previous researches. It would appear that from atmospheric causes, a part of the vegetable albumen which prevails in the potato has become converted into vegetable casein. The instability of this last substance is well known; hence the facility with which the potato containing it undergoes putrefaction."

At the Academy of Sciences, Paris, 1845, November 17, M. Boussingault communicated an extract of a letter from Joachim Acosta, of Bogota, relative to the potato disease. It appears from this letter that the malady is very common on the table land of Bogota; that it is destructive in wet seasons, or even every year in damp spots. M. Acosta does not doubt that the malady has always been known there, since it excites no alarm among the Indians, who live principally upon potatoes. M. Boussingault properly remarks that in these countries, where cultivation continues without intermission during the year, and where the tubers are consumed without the necessity of storing them, there is no fear, as with us, of a bad harvest, be-

cause it may be replaced immediately by a good one. With us, where the culture is annual, and the product must be preserved through the winter, it is natural that we should be concerned in a malady which may destroy the resources of a whole year."

The *remedies* suggested for the cure or prevention of the evil, both in Great Britain and on the continent, embrace the *two* great objects of the *present* and *future* crops. The attention was of course first directed as soon as possible to *prevent the spread of the disease* any further, and to save those which still remained sound in the soil or after they were dug. After the disease had advanced, and all that could be expected had been suggested in the first and subsequent stages of the disease, as related to the then present crop, the inquiry naturally became one of yet deeper interest, whether the same alarming decrease of the potato crop was to be expected the next season, and to provide means, as far as possible, to ward off such a calamity. It is not always possible to keep these distinct, as, when the disease advanced, the two points were often naturally mentioned in connexion.

On the first appearance of the disease, in the opinion of the editor of the Gardener's Chronicle, there was no cure. He says: "Should we have fine weather, the disease will disappear; should rain and cold continue, it will spread." This of course is in accordance with the view he had taken of its cause. He advises to let the potatoes all rot in the cold ground, and says that perhaps *mowing the haulm* may be useful. As a remedy for their unripeness, he suggests "putting them in heaps, with alternate layers of dry earth and tubers." In his next number he recommends "*kiln-drying*" as a mode to be adopted for driving off the moisture. The next article on the subject says: "It will not do to pit potatoes in heaps, covered with straw and dry earth, as the tuber infected with mould will give the disease to the others. If pitted, they must be separated each from the other by earth." The kiln-drying is again recommended, (September 20.) and the process resorted to by Dr. Valdez, of Brussels, is quoted. He heated an oven to nearly 180° Fahrenheit, in which he placed diseased potatoes, both whole and cut. After a few minutes, a copious blackish matter oozed out of the potatoes, and they emitted a nauseous fetid smell. "This matter came out, and, when the potatoes were not too much diseased, they became white again, and nothing remained of the rot except a slight brownish layer adhering to the skin, and easily removed by peeling. This layer is compact, and will permit nothing to pass through it into the interior; it loses, moreover, all power of injuring the sound parts that remain." When the potatoes are quite dry, which Dr. Valdez found to be from eighteen to twenty-two minutes, they may be removed from the oven.

The suggestion was early made of arresting the decay in the ground by the use of chloride of lime and salt. Professor Morren also recommended salt by the use of a steep composed of 54 pounds of lime, $\frac{1}{4}$ pound of sulphate of copper, 7 pounds of salt, and about 25 gallons of water. Others, too, resorted to steeps variously compounded, but embracing one or more of the articles above named. Sulphur is also mentioned as useful on the tops and tubers. In some cases, salt is considered to have been anything but preventive in its effects. The fact that the disease was so great in the islands of Jersey, Guernsey, and Wight, where it first appeared, as well as along the seacoast, where it spread, was urged as a decisive proof that salt

was not an effectual preventive. Instances on both sides of the question are cited.

Professor Liebig recommends "the cutting of the diseased potato into slices of about a quarter of an inch thick, and immersing them in water containing from two to three per cent. of sulphuric acid. After 24 hours, draw off the acid liquor, and wash away the remains of it by steeping the cut potatoes in water. Then let them be dried. The pieces are said to be white and of little weight, and can be ground to flour and baked into bread along with the flour of wheat."

The following suggestions are also made as to means of prevention: "In the Dusseldorf Gazette it is stated that a farmer, living on one of the estates of the Duke de Aremburg, near Dusseldorf, has discovered a mode to prevent the rotting of potatoes, and even of curing it where it has already commenced. The method is very simple: it consists in merely harrowing deeply the earth in which the tubers are planted, so as to produce an evaporation, which will diminish the fermentation caused by humidity; and it is added, that the plan has proved to be completely successful. Let it be tried wherever it is not now too late. In our publication of Monday, we quoted from the Moniteur a proposition for preserving from decay potatoes partially tainted, by a sort of semi-baking in an oven heated to 64 or 65 degrees of Reaumur, (about 180 of Fahrenheit,) and the plan like that of converting them into facula or arrowroot may answer very well on a small scale. We would recommend slicing, stringing, and hanging them in kitchens and outhouses, as apples are managed in America, as a means of saving part of the crop, in addition to the two first described methods."—*London Freeman's Journal.*

Steaming potatoes, and then drying them, has also been stated to be successful by a correspondent of the Mark Lane Express. The writer says, that "on opening a pit containing 100 sacks of potatoes, nine-tenths were found to be diseased." To his surprise, "on steaming them the offensive matter was removed, and the remainder was perfect and fit for use."

An experiment by Major Beamish is also mentioned in the same journal, in which, by boiling the diseased tuber in two waters, he rendered it available for human food.

One of the earliest recommendations respecting the use of the diseased tubers, was that of *converting them at once into starch and flour.* This brought up the question, whether they were poisonous; and experiments were tried in England, and on various parts of the continent, to determine this question. The conclusion seemed to be decisive, that, as a general thing, they may be used with safety, provided suitable precautions be adopted. Professor Lindley speaks of a fine potato flour received from some of his correspondents, and says: "Professor Henslow found that while a half bushel of sound potatoes yielded 4 pounds 10 ounces of flour, the same quantity of diseased ones furnished 3 pounds 10 ounces." Numerous methods of preparing flour and starch, agreeing in the main, are found in the agricultural journals. We have extracted several of these in our appendix No. 6.

A curious experiment is named in a French paper as having been tried by M. Bonjean, of Chambery, who lived for three consecutive days on bad potatoes, which had been thrown aside as refuse. He said, that, to determine the question of danger, he had none of the diseased portions cut away. In three days he ate 8 lbs. in butter, in soup, or simply cooked in water,

without any inconvenience, except a slight indigestion. He also drank in the morning, fasting, a glass (about 8 ounces) of water in which about 5 pounds of putrid tubers had been boiled; it was of a yellowish brown color, turbid and thick, but not viscous; of a slightly disagreeable smell and nauseous taste, leaving a bitterness which remained on the palate for an hour. He says he found "no other symptoms of indigestion from this liquid except a disagreeable heat oppressing the chest for about two hours." Whatever may be thought of M. Bonjean's taste, his philanthropy, at least, is deserving of praise.

In a statement of a method of use, made by M. Croker, at a meeting of the Cork Agricultural Society—which is very valuable, as it may be adopted in any family—he says:

One weight (20 lbs.) of sound white potatoes will produce of dry farina, or flour fit for use -	3 lbs.	9 oz.	0 drachms.
One weight (20 lbs.) of unsound, and diseased part cut off - - - - -	3	1	0
One weight (20 lbs.) of unsound minions -	3	1	0
One weight (20 lbs.) of unsound and paired -	3	0	0
One weight (20 lbs.) of unsound potatoes, none cut off - - - - - -	3	6	0

"The farina or flour from these will be dry and fit for use." He also states that diseased potatoes make as good starch as the soundest. "The bad parts need not be cut off; they must be well washed to prevent the earthy particles from mixing with the flour."

The suggestions of the Irish commission, in their report, as well as those of agricultural clubs, chemists, &c., respecting the methods of using the crops, are highly valuable, and will repay the time spent in their perusal. The Hadleigh Farmers' Club, in their statement, give a number of simple directions, which propably embrace the greatest number of particulars in the shortest compass of any of the public documents we have seen.

It is a point of much interest and discussion, "How shall the next crop be prepared?" It does not seem to be positively decided that diseased tubers might not be used, but it is recommended that, as far as possible, this should be avoided. Mr. Berkley states that the presence of fungus would not necessarily vitiate the powers of production. "He states," say Professors Lindley, Playfair, and Kane, "that though there would certainly be some risk in raising a diseased progeny from a diseased stock, yet the growth of fungi so evidently depends on atmospheric condition that it does not follow that because germs are present they should be developed." The use of home grown potatoes, that have remained sound during the winter, is admitted to be safe; but it is recommended that autumn planting should be resorted to instead of spring planting, and that the potatoes should be planted as far as possible from where the diseased ones are raised. The use of certain substances, as lime, salt, &c., is also suggested as likely to prove of advantage. The procuring of new varieties, also, occupies considerable attention, and a number of papers containing valuable suggestions on this and kindred subjects will also be found in our appendix No. 6. Mr. Patillo and Professor Lindley both recommend as best for seed potatoes those which are *not* the best for table use. Mr. Tison states, in reference to seed potatoes, that he plants an early crop, and, when fit, he removes them, setting in their place small waste potatoes saved from last season. When about half grown, and the tops are still luxuriant, &c., he takes them up

and spreads them over the land, allowing them to lie until winter—turning them; and they always yield more and better potatoes.

In reference to autumn planting, Professor Lindley recommends to look for the *early* varieties, and also to keep in mind the important facts—"1. The eyes at the top of the potato are the youngest, and vegetate first; from them the crop obtained will be a fortnight earlier than from the lower end. 2. When the potato is not cut, and the top eyes are allowed to proceed in their own growth, they push slowly, if at all. 3. If the top sprout be removed, the other eyes will begin to grow with greater vigor. 4. The top sprouts may be removed when they begin to show roots, and planted out for the earliest crop, and the rest of the tuber be allowed to push the other eyes, &c. 5. If sets are scarce, stems may be layered; they will root and form a second crop of tubers; but this must be done early in the season, or before the first set of tubers is fully ripe, though large enough to be fit for use."

An interesting paper, in the Irish Farmers' Journal, on the productiveness of potato sets, (for which see the appendix,) gives a statement respecting the different kinds of sets, as follows:

		Produce.
No. 1.	Tops, or rose eyes	24 pounds.
2.	Bottom eyes	14½ do
3.	Strong eyes, that had sprouted	20½ do
4.	Later eyes, that had not sprouted	16 do
5.	Cut downwards, with protuberance	14 do
6.	Cut upwards, without protuberance	14 do
7.	Nipple eyes	7½ do
8.	As in No. 5	20 do
9.	As in No. 6	14 do
10.	As in No. 7	5 do
11.	Deep eyed sets	11 do
12.	Shallow-eyed sets, disposed to nipple	11½ do
13.	Deep eyed, mixed with a red potato	8 do
14.	Deep-eyed, mixed with a red potato	16 do

A writer in the Gardener's Chronicle states, that from 18 large cut potatoes, weighing 7½ pounds, last spring, he took 176 fine scoops one inch in diameter and one inch deep, which weighed 4½ pounds. An acre planted in rows, 4 feet asunder, the sets 9 inches apart, would take 14,520 sets, weighing only 3 cwt. 1 stone; with refuse, fit for food, 2 cwt. and 3 stone. Mr, Gray, of Dilston, in the Chronicle of October 25, gives an account of an experiment on the comparative produce of autumn and spring planted potatoes, the results of which he describes as being thus: "The average length of the drill rows required to fill the sack—

Of October planting, was	30 yards
Of November planting, was	32 do
Of December planting, was	32 do
Of March planting, was	41 do
Of April planting, was	45 do

Which leaves to the October planting an increase of one-third over that of April."

J. A. Dorant, of St. Albans, says, in favor of autumn planting, that it

seems to protect from the blight. He states that his crop, on being taken up, is found to be a fair average one—free from murrain or any disease; as clean and fine flavored as he ever dressed.

In a pamphlet by R. Arthur, he recommends the hybridization of potatoes, to obtain the best seed. The method is the following: "Select 6 or 12 superior healthy varieties; place one tuber of each in a warm situation, and cover it with earth. When the eyes have sprung 4 or 5 inches, take the strongest one from each tuber, with a good set to it. Put each set into a good flower pot, and cover it about four inches with peat earth and rotten dung. Bury the pots to the brim in a warm place till the stem grows six inches to a foot in height. Then turn the pot upside down, holding the stem of the potato between the two inside fingers of the left hand. Lift away the pot, and so leave the ball of mould entire. The young potatoes will be on the outside of the ball. Remove these carefully, and also the old set if it is there. Plant the set out in a rich soil, at the base of a west or south aspect wall, and water it well. Train each plant by a single stem on the wall, and give it liquid manure in dull showery weather. When the flowers appear,thin them out with scissors, and leave only one or two of the strongest. The moment they *begin* to expand, cautiously open each flower, and with small scissors or tweezers remove the fine little anthers, leaving the centre stigma. The next morning procure a full-blown potato from the field, and dust the pollen of its anthers over the stigma of the flower so prepared. Do this again the next morning. In this way hybrids or mules can be obtained between any two plants of natural affinities. Remove early any young potatoes which may be produced near the surface; and so the plant, when well grown and not producing potatoes, will produce, says Mr. Arthur, enormous seed plums, which will produce some hundred varieties of blacks, whites, reds, &c. The sorts should be labelled, &c. The plum, when ripe, is to be preserved from frost till shrivelled, &c., and then the pulp may be mixed with peat mould till sowing time."

Mr. Arthur strenuously urges that if potatoes are cut for planting, it should be in the autumn, and not in the spring. He seems to suppose that much of the evil arises from the latter practice. He says, "it may be cut at any time during its dormant repose, as it is protected during the winter." But, he says, "it is contrary to nature to dissect it at the only stage of its annual life, when we know all other plants bleed excessively if wounded." Curl and wet rot he thinks to be "produced by the effects of wet land or wet cold seasons operating on the set, and surcharging the empty bled vessels with cold unnatural sap," &c.

In another pamphlet which has been called out by the prevalent disease, the author says that he considers the great error to be in "planting the seed in a quantity of dung laid in the middle of the drill." He would place the potato in the clear soil, on the back of the half-drill formed by the return of the plough, which half-drill should be made larger than ordinary, to bring the seed as near the centre of the drill as possible, the manure having been spread evenly over the surface and dug in. He also recommends attention to the selection of varieties by adoption of some of the inferior kinds less liable to disease.

In the appendix No. 6, among other papers will be found a list of queries by Professor Johnston, to aid him in the investigation of the disease. This will be useful in directing the researches of farmers and observers another year. As reference has been made to the rot described by Von Martius, in

Germany, in 1842, we have also added some papers on this subject; one of them, translated from his report as found in the Central Blatt des Landwirthschaftlichen Vereins, of Bavaria, on purpose for this report. It was our intention to have subjoined extracts also from another work of his on potatoes, as likewise translations from the German, Belgian, and French Professors, but they have not as yet reached us. It will be seen, we think, that the disease in Europe greatly resembles that in this country; though it may be, and doubtless is, occasionally modified by the difference of circumstances in the two countries. We have not expressed any opinion as to its cause, &c., as, amid such conflicting testimony, it seems advisable to wait for more light. The great importance of the subject will form a sufficient apology for dwelling at such length upon it. Our aim has been to furnish, as well as we might, a condensed view of the progress of the disease during the past year; and this we have had to do by devoting much time and labor to collating a vast number of papers, letters, pamphlets, &c., some of the most prominent and useful of which we have placed in full in our appendices. We believe that we have not passed over any opinion of importance. This mass of materials will be more readily at command for observers another year, and perhaps may afford important aid in anticipating and arresting the progress of the disease in future. The theories may all be wrong; but the evil exists, and it will be a real benefit to our country, and the whole civilized world, if its ravages may be checked and terminated.

The American Institute, in a late session in New York, passed the following resolution:

"*Resolved*, That the alarming situation of a great part of the world at this time, in consequence of the disease called the rot in potatoes, requires the most active, prompt, and untiring exertions of all the producers of this most important production to subdue, if possible, the frightful ravages of this disease, and to prove, by successful experiment, that the country which originally produced this valuable root, one of the most sustained sources of subsistence to the population of Europe as well as our own country, can provide a remedy to prevent its extinction."

HAY.

Hay is a more important crop in New England and some of the middle States than in other parts of the United States. The vast prairies of the west, and the moderate climate of the south and southwest, allowing pasturing even during the winter months, render the cultivation of the English grasses less an object of attention in those sections of our country.

The crop of hay seems to have been very good in Maine. The Maine Farmer, speaking of it, says, July 11: "The grass crop, from present appearances, will be light; nothing near an average one. In many newly laid down fields we noticed that the ground was hardly covered with a decent mantle of green, the clover having been winter killed. The old and middle aged mowing fields, with but few exceptions, along the whole route, looked remarkably thin, and, unless the late propitious rains have given the grass a healthy and unprecedented impetus, the growth will be small, and the crop harvested not more than adequate to meet the wants of the farmers and supply the village markets." Again, July 31: "Our farmers are in the midst of this important harvest, and we are happy to state that, although

the season was at first very unfavorable for grass, and promised a scanty return, the results are very good. In this vicinity the crop is nearly as abundant as it was last season, and the quality is undoubtedly far better. For the last week the weather, owing to the frequent showers, has been rather unfavorable for getting the hay into the barn; but the benefit that has resulted to the other crops from the seasonable rains more than counterbalances this trouble." Again: "We are happy to state, that although the season was at first very unfavorable for grass, and promised a scanty return, the results are very good. In this vicinity the crop is nearly as abundant as it was the last season, and the quality is undoubtedly far better." At an earlier date the Norridgewock Press says: "Vegetation of all kinds along the Kennebeck looks extremely promising. Hay seems likely to turn out as abundant as last year." There was probably a small increase, therefore, as the crop of the previous year was a good one, of perhaps five per cent. In New Hampshire the drought was so severe as to cut off the crop to a large extent. By some the falling off is put as high as "fifty per cent." In the southeastern part of the State it is believed to have been "fifteen per cent. less." Further west, and in the central southern section of the State, it is estimated at "twenty-five per cent. less." A correspondent still higher up on the Connecticut river writes thus: "Long continued dryness had a bad effect upon the hay crop as to quantity, though the quality is considered to be unusually good. Taking both into consideration, the regular crop cannot be well estimated at more than two-thirds of an average one. The copious rains of August caused the grass to spring up with unusual vigor, and the aftermath, or second cutting, was more productive than common, and the feed in the pastures in the latter part of the summer was unusually good. Fields recently laid down to grass, and which were in good condition, suffered none, unless the land was very light and sandy; on the contrary, many new pieces of mowing yielded a very heavy crop, while such as had been in grass for three or four years yielded very scantily. Farmers are apt to let their grass remain too long—as long, indeed, as it will, in ordinary seasons, yield a barely remunerating crop; and thus they are sure to suffer when the summer is even but a little drier than common. Did a better organized and shorter system of rotation prevail, it seems probable that such a drought as that of last season would have injured the hay crop but little." The crop for the whole State (regard being had to the proportion the counties bear in the returns of the census) is believed to have been twenty-five to thirty per cent. less than in 1844.

The severe drought also affected the crop in Vermont, although, it is believed, not equally with that in New Hampshire. In the lower part of the State it fell off perhaps "ten per cent.;" in the upper it appears to have been "about the same" as in the previous year. The whole decrease was probably from five to ten per cent. Some fine crops are mentioned as having been presented for premium at the fairs, &c.; but these, as they are secured by extraordinary means, form no fair criterion as to the general crop. Five acres, in one case, yielded 372,000 pounds, or about $3\frac{1}{2}$ tons and 440 pounds to the acre. This was produced by means of top-dressing and irrigation.

Another account is as follows: "Mr. H. P. Hickock, of this place, (Burlington, Vt., Free Press) gathered in from $2\frac{1}{2}$ acres of meadow, last week, thirteen great loads of hay in good order. The hay was herdsgrass, with a sprinkling of red clover and red top; and the loads are estimated by

the hands in the field at one ton each. This field was cleared of pine stumps, and heavily manured, some 25 years ago. Since then it has invariably produced large crops, mostly of hay, and with very little manure of any description. Five tons of the best hay to the acre is something for the most fertile district of country to tell of."

The accounts of this crop in July and August, in Massachusetts, are discouraging. Thus the Massachusetts Ploughman, of July 14, says: "We had in this vicinity last week six good hay days, and much of our early hay was secured. It is now the 14th, and the weather is quite dry enough for any purpose. We shall expect no rain, but of nights and on Sundays, till haying is over. This is the week for herdsgrass, red top, Rhode Island, and the spear grasses." Later in the month, "the Greenfield Gazette reports the grass crop as light, and states that many farmers have commenced their haying; and it is believed the crops will not be more than two thirds yield." And in August it is said: "The crop of grass, however, is generally light, and will probably not much exceed the consumption."

In the northeastern part of the State it is thought that the drought lessened the crop of English hay "25 per cent." Fresh meadow hay was "10 per cent. better;" and salt hay also gave an increase. In the central, along the eastern part of the State, the deficiency is differently estimated in different towns, from "10 to 40 per cent." In the interior, "10 to 15 per cent. less;" while in the western section it probably fell off "one-quarter." A correspondent of the Boston Cultivator, writing from Berkshire county, in the early part of July, says: "The crop of grass is now very light, and should it be cut at the usual time of haying, there would probably be a falling off of one-half from last year. But the rains which have commenced falling for the last two or three days have given it a new countenance; and, should July be a wet month, there may yet be a supply." The general effect of the drought probably reduced the crop for the whole State 25 per cent.

The crop of Rhode Island is believed to have been better than in the preceding year. In Connecticut there was some decrease—probably 15 to 20 per cent.

The hay crop in New York was less than in the preceding year. Great complaint is made of the drought. Thus the agricultural report for July, in one of the public journals, says: "We have had a miserable season from the commencement. May and June were unusually dry months, and July has exceeded them all. The grass never looked worse. Clover ripened prematurely, and was cut out of season. The yield was hardly enough to pay for the labor. Timothy grass suffered less, but the crop, although secured in beautiful weather, turned out to be less than half the usual yield." We have never known the pastures to look so uninviting. The ground is apparently burnt up. Vegetation where the grass has been cut is dead. The springs are dry, and low grounds that are usually wet and swampy are as dry as the hills. Cattle show the poverty of the pastures by their appearance; and the cows fail to supply the usual quantity of milk." And the same paper, for August, says: "The rains came too late to help this indispensable crop, except on the salt meadows. The yield of the uplands is a failure; but the salt grass, which is an important article, is turning out remarkably well. The rains have fallen so seasonably, that the second cutting will, in many places, be uncommonly large. The change between July and August can hardly be realized. The fields that were a month

ago burnt up to such a degree as not to afford the promise of a spear of living grass, are now clothed in the richest green."

A Troy paper of July also states, that "the grass crop will not be more than an average one."

A paper in Buffalo gives the following statement in July, respecting the hay crop in that region: "We shall have a lighter crop than has ever before been made in this country. Thousands of acres have not yielded half a ton to the acre. It is safe to say that the crop will not yield more than one third. Farmers are devising ways and means to meet this alarming state of things. All the stock that can be possibly spared will be sold or slaughtered. Sheep will be slaughtered by the thousands, because they pay better than any other stock, and wool has been low, and dairy products higher in proportion. There will not be near as many sheep wintered the coming winter as there was last. The decrease will be a great many more than the increase this year."

In the Batavia Times, in August: "Grass, though not half the usual quantity, is excellent in quality; one ton being equal to $1\frac{1}{2}$ ton in ordinary seasons."

Complaints respecting the crop are also made in the northeastern section of the State. The accounts from other sources represent the crop in general as light. In some few cases it may have been an average, but in most cases it fell from "10 to 25 per cent.;" in some instances even "50 per cent." In Westchester and Rockland counties, it is thought to have been somewhat more. Further up the river the decrease, in some cases, is rated at "40 per cent." greater than in 1844, and northward from "25 to 50 per cent." In Ulster and Delaware counties, about the same decrease. In Otsego, Schoharie, and vicinity, it was considered "an average crop," and of "a very superior quality." Along the Mohawk valley, and northward, from "15 to 25 per cent." less. In the central portion of the State, to the east, the decline was from "20 to 25 per cent.," on account of the frosts late in the spring, and the dry weather succeeding. Towards the lake it was, perhaps, not so much decreased; while as we proceed westerly, in all the counties, there was a lessening of the crop from "20 to 25 per cent." at the north, and from "10 to 15 per cent." south and southwest. The falling off for the whole State was probably about 25 per cent.

The crop of hay in New Jersey seems, also, to have been quite light. In the western part of the State the drought was felt so severely that it is thought the decrease was from "33 to 40 per cent." In the central section of the State, also, it is said to have been very light; indeed, "about one-fourth" of the usual crop. Still lower down there was a similar decrease, as we may see from the following extract in reference to one kind of grass: "The crop of herdseed grass in Salem county, New Jersey, the present year, will fall short of that of last year at least two-thirds, occasioned by the frosts last spring, and the drought that followed during the summer. Salem county furnishes a large portion of the herdsgrass seed for market of the whole Union." The decrease for the whole State must have been from 20 to 25 per cent.

The early promise in Pennsylvania, which is among the foremost of the States in the amount of this crop, was good; but, on account of the severe drought, it fell off almost every where. In the vicinity of Philadelphia the decrease is estimated at "25 per cent." In Chester county, "one-half;" Lancaster nearly as much—"30 or 40 per cent." The crop, we are told,

was "very light" in general. "Some well informed farmers think it was not more than 50 per cent. of last year's crop; others are of opinion the difference was not so great." Our informant inclines to the latter view. In the counties of Adams and York, lying along the line of Maryland and the Susquehannah, it is judged to have been "50 per cent. less." In the east central section of the State there was "not more than half a crop." The deficiency was not so great probably in Columbia, Luzerne, and Wyoming; while in the northwestern counties, towards the centre, the falling off from the crop of 1844 is fixed as high as "30 per cent." We believe that from 25 to 30 per cent. less will not be too great an average for the whole State.

The same was no doubt the case with Delaware and Maryland. In the northeastern section the decrease is rated as high as "one-third." Virginia, with the States lying south along the Atlantic coast, raised but comparatively little hay; and hence it is not easy to get any very definite information respecting them. The drought, however, was severe, as we have already seen in the accounts of other crops. The lessening of the crop from that of 1844 in Central Virginia was great, as it is said to have been almost totally destroyed. In the northwestern part of the State, as well as on the Kanawha and its branches, the decrease is estimated at "40 per cent." According to the best judgment we can form, one third less than the crop of 1844 may be considered rather under than over the truth.

The universal account both from North and South Carolina, is at least "50 per cent. less." The Southern Planter, speaking of this section, says: "The clover crop has probably suffered most, both the crop of this spring and the last; and we regret it the more, because this great improver, owing to the low price at which the seed has been sold, has been very extensively seeded." In Georgia, likewise, the drought greatly injured the crop; and in Alabama, also; but in this latter State, probably not as much as in the former. In Tennessee, in some parts the crop fell off, and in others was improved. In Kentucky, the decrease is said to have been "15, 20, 30," and even in some sections probably "50 per cent."

The hay crop also suffered greatly in Ohio. The report of jurors from various counties, as furnished in one of the public journals, is as follows: Lake county—"Grass crop light; not more than one half, or one-third." Highland—"Very light." Meigs—Grass, "two thirds of last year's crop." Fairfield—"Very light." Guernsey—"About a half crop." Hamilton—"Hay crop smaller than usual, and inferior in quality." Butler, Warren, and Preble—"Much as in Hamilton."

The accounts otherwise obtained are similar. In the northeastern section, on the Reserve, it is judged to have fallen off "two thirds, if not more." The same was the case in the counties bordering on the Ohio river and Pennsylvania, east of the central counties. In the immediate central counties, including Delaware, Marion, and Richland, it is considered to have been from "20 to 25 per cent. better;" and the decrease was not so great as in some of the other sections; probably not more than "15 per cent.;" while in the southwest the drought caused a great falling off of the amount made. In the southwestern section of the State the crop was "20 to 50 per cent. less." It was much injured by late and heavy frosts, and a severe and protracted drought. While in the northwestern and along the lake, towards the centre, west, it is variously estimated at a decrease of from "20 to 50 per cent.," and even higher. It is evident, therefore, that there was a large falling off of the hay crop, and we believe we are within bounds

when we put it at an average of one-third less than the crop of 1844, which was a considerable gain over the crop of the preceding year. We should say that this was, if it needs any correction, too small a deduction, and perhaps the falling off should be fixed as high as 40 to 50 per cent. The Painesville Telegraph, speaking of the region near the lake, says: "They are forming clubs and sending forth men to secure the grass that grows on the prairies in great abundance, and free to all; and in the fall the cattle will be driven out to be kept through the winter, and returned again in the spring."

As early as June it is stated of the Indiana crop, in an agricultural journal, that "grass in the State will be light—the recent rains being too late to be of benefit to this crop." In July the prospect was better. Thus, the Indiana Farmer says: "The grass has thickened up since the copious rains, and there will be a fair crop. There is enough old hay in the country to afford very nearly a supply for the year, even if the present crop wholly failed."

Other notices are like the following: "Peru, in Miami county.—Grass is almost an entire failure in this county, in consequence of the drought and cold." "Wabash county.—The crop of grass was bad generally—not, perhaps, more than half the ordinary crop; the dry weather in May and June nearly destroyed it."—*Indiana Farmer.*

A correspondent of the Farmers' Cabinet, from Richmond, in Indiana, describes the crop thus: "Grass, owing to the drought, is mostly light, though better than the farmers had anticipated." The Indianapolis Sentinel also speaks of the grass as about almost totally to fail. The almost universal estimate we obtain from all parts of the State by other sources is, that there was a great falling off—50 per cent. from the crop of 1844. In the central section, towards the west and northwest, it may have been somewhat better; perhaps not more than 30 per cent. less.

Illinois, with her extensive prairies, cultivates but little hay; and Missouri still less. In the section of the State west of the Illinois, to the Mississippi river, or the central western, it was better by 20 per cent. The heavy rains of last year (1844) greatly injured it there. In other parts it fell off from 10 to 20 per cent. In Michigan, in general, it fell off. In the eastern central section it is put as low as "three-quarters less." Southeast, and along the southern border, the decrease is thought not to have been so great; and the editor of the Michigan Farmer estimates the decrease from the crop of 1844 at "10 per cent. less." Probably, for the whole State, the falling off could not have been less than 15 or 20 per cent.

In Iowa and Wisconsin there appears to have been a general increase. Many persons who settle in those sections have been accustomed to this crop, and therefore it receives considerable attention. If we should reckon the hay made from the wild prairies, they would each, both Iowa and Wisconsin, exceed 100,000 tons. The whole crop of hay, therefore, for the United States, is estimated at 14,065,000 tons.

We have met with a number of interesting articles connected with the hay crop, especially relating to the *time of cutting*, *quantity of seed to be used*, *modes of cultivating*, *and preserving it*, which may be useful and interesting; and as such, we shall here make allusion to them, either by full quotations or in substance.

The Michigan Farmer gives the following as a good method for preventing must or mow-burn in hay: "Take a number of smooth poles and lay

the butt ends outside, so that they may be easily pulled out; let the mow or stack settle for a few days, then pull them out; this will leave a passage for the air into the hay, that will insure it against must or mow-burn for some distance around the holes."

A correspondent of the Prairie Farmer says: "People differ as to the quantity of clean timothy seed to sow on the acre. Some say half a gallon; and one man told me to sow half a bushel to the acre. I believe, from twelve years' experience, that, on our rich prairies, from four to six quarts will be sufficient; and if the ground is well set, do not let the grass get too ripe before cutting, as it will scatter seed and soon get the ground so that it will bind out, as it is called."

As regards the time for cutting hay, we quote as follows, from the Boston Cultivator: "With regard to the best time for cutting herdsgrass for hay, even practical men are divided in opinion. In a late conversation with Mr. Isaac Reeves, the proprietor of the large peach orchards in Delaware, to whom every practical man looks up with deference and the highest respect, he observed: 'I will take an old piece of herdsgrass, that at present yields less than half a ton of hay per acre, and at the end of five years, without breaking up, fresh seeding, or manuring in any way whatever, I will raise the crop to two and a half tons per acre. This I will do by merely permitting the crop to stand until the seed will just vegetate before cutting. By mowing the crop sooner than that, the roots bleed and die out; and that is the reason why a second crop does not spring up until a long time after. I once purchased the fifth part of the crop of timothy on one of the islands in the Delaware, with the intention of cutting the grass on my lot at the same time the other four purchasers cut theirs; but I was called from home, and it was not cut until the seeds would vegetate. I thought my hay was spoiled, but it was preferred to all others for horse feed; and behold! the next year my lot of land yielded double the crop of the others, and at the end of five years it had increased to two and a half tons per acre; having overgrown all other grasses—a uniform crop, five feet in height, and preferred before all others at the market. Since then I have never cut timothy until the seeds would just vegetate.' Mr. Phinney considers early cut hay the best for dairy stock; for oxen and horses he prefers to let it stand longer; the object in the first case being milk—in the last, flesh or strength. But then comes the grand consideration: the renovation of the crop by preventing the bleeding of the roots; a new idea. And would our friends examine the subject, and give us the result for the columns of the Cultivator?"

A method of top-dressing grain and grass crops is used in England, which is there called *Gurneyism*, from the inventor and introducer. It consists of covering grass land with straw, &c., and allowing this covering to lie till the grass springs through it (which it does with astonishing rapidity) to the desired length, and then raking it off to allow the beasts to reach the pasture. This is then applied to another piece, and then removed and applied again as long as the straw and covering will answer to be applied conveniently. The following is the account as given from English papers by the American Farmer: "*Covering grain and grass crops with straw.*—The Hon. G. Gurney, of Woodleigh, Cornwall, England, has been successfully experimenting with straw, rushes, and brushwood as a top dressing for grain and grass crops. He applies a ton and a quarter of straw to the statute acre, by spreading it evenly over the crop while growing, any time between the months of April and October; and when an early crop of

grass may be desirable, he spreads the straw in the latter part of February. Thus far his experiments have been tried upon wheat, vetches, meadow-grass, and clover lea; but there can be no doubt it would prove equally beneficial if applied to any other of the families of small grain and grasses. Mr. Gurney, in reply to a letter of inquiry upon the subject, remarks, that the instances of benefit are numerous, and that there is not one upon record where it has failed, except in cases where too great a quantity of covering has been applied, or, which is by far the more general, where too little has been applied." At a meeting of the East Cornwall Experimental Club, Mr. Gurney made the following remarks: "About seven weeks since I covered half a field of three acres of grass in this manner, and about a fortnight since, when examined, the increase was found to be at the rate of 5,000 pounds per acre over the other part of the field. At the same time, the straw was raked off and laid in rows about twelve feet apart on the field; 115 sheep were then put into the field with a view to eat it down as quickly as possible; and after they had been there about a week, they were succeeded by 26 bullocks, to eat off the long grass which the sheep had left. The field was eaten as bare as possible. The same straw was now thrown again over the same portion of the field from which it had been raked; and on inspection this morning, I found the action going on under it as powerfully as before." Mr. Gurney thought that the sheep, on the first raking off of the straw, were not so fond of the grass as they were of that uncovered; but after twenty-four hours' exposure to the sun and air, he thought they rather preferred it. He had now forty acres under operation, and he had grass where his neighbors had none. The editor of the American Farmer says, in reference to this mode, "Mr. Gurney's practice is to rake off the straw, and to feed the grass to his sheep once a fortnight, or once in three weeks. This raking off and reapplication of the straw does not appear to us to be essential to the success of the operation. What its *rationale* is, has not as yet been settled in England, nor in Russia, where experiments are being carried on; but in the absence of such settlement, with regard to the action of this straw dressing there are various facts, besides those adduced by Mr. Gurney, going to establish its efficiency in the promotion of the growth of such grain and grass plants as it has been applied to; and with those facts to encourage experiments, it would be turning a deaf ear to the voice of experience in our country, were not our agriculturists to profit by the experience of Europe. In the south, especially, where the artificial grasses are difficult of substantial culture, we doubt not that such dressings would be found of singular utility. Where straw may be found to be scarce, we should not hesitate a moment in substituting for it leaves and pine shatters from the forests. These, fortunately, can be obtained in almost all situations with us, and we doubt not would prove, on trial, eminently serviceable."—(See appendix No. 7.)

Again: "*Top dressing for grass lands.*—A writer in the Gardener's Chronicle lays it down as the result of his experience, first, that the proper time to top dress lands is in the fall; and, second, that the stock should not be permitted to run late thereon in the fall. In support of the first of these propositions, he maintains that, the temperature of the atmosphere and soil being cold in winter, the dung affords protection to the tender roots of the plants, and that whatever particles of fertility which may exist in the manure are in winter washed down into the soil, and lose but little of their virtue by evaporation, and that the drying winds and sun of summer are

more injurious to the manures than any drenching rain can be. Immediately after the atumnal application of manure, he recommends that the meadows should be thoroughly harrowed. A most wise recommendation is this; one that will greatly encourage the economy of the manure."

In the Mark Lane Express, of July 21, there is an account of salting in grass and hay in wet seasons, which is stated to be very useful. Mouldy hay put together with salt, from 8 to 25 pounds per ton, was better relished by cattle, and did more good, than sound hay stacked without salt. In some instances hay stacked damp with salt, so that it came out almost a paste from the rick, when opened, was devoured with avidity by the cattle. "In Germany, grass fresh cut is packed in with one pound of salt to the cwt., and it is said that it goes much further than the same quantity of grass made into hay. A method recommended as better is to stack the green grass or clover in layers, with straw and old dry hay, sprinkling salt on each green layer. The juices drawn from the grass by the salt will be absorbed by the straw or old hay, and not only the damp hay or grass will be made more nutritive, but the straw itself may thus be brought towards the state of the green stalk by the salt which it absorbs, and by which it is gradually softened, and thus made soluble and digestible. The proportion, though various, according to the dampness of the grass, will be about in this ratio: Good upland grass, cut in dry weather, contains about two-thirds of its weight of water, or two tons in three, and one ton of straw will absorb three tons of water; but as it is not wanted wet, we may allow four tons to one ton of straw; and if the grass, by aid of the salt, gives out half of its juice, we shall then have the whole soft and damp, without being disposed to drop or leak. If old hay is used in place of straw, one-third or one-half may be enough, as this absorbs less. For meadow grass or green fodder, cut damp, the straw or old hay may be increased in proportion. If the hay is partly dried, none perhaps may be needed. The best proportion of salt must be decided by trial. One pound per cwt. may be too little for fresh grass. Two pounds per cwt., or about one-half bushel to the ton, is thought to be not more than the cattle would relish, and which is more likely to preserve the whole in a sweet and digestible state. For half-dried hay one pound per cwt. may be enough. Bran is said to be a good substitute for straw or old hay. The only difficulty would be its liability to ferment and heat."

In the New York Farmer and Mechanic we find an article on the *science of mowing*, and as the rules given are simple and practical, we give them as Mr. Pitkin, by whom they are communicated to that journal, somewhat quaintly states them. He says: "It was my good fortune (for so I regard it) to have had a few years' experience in early life as a practical farmer; and as I advanced from boyhood, I remember, among other things, my first efforts and ultimate success in the science of mowing. For a time I had much difficulty in keeping my scythe sharp. This, however, I found to be indispensable. No man can approach any thing like an easy or good mower without it. I had become a good mower, when I fell in company with not only a good mower, but a scientific one; and after the second or third day, finding that I could not keep up with him without doing myself an injury, and painful as it was for me to acknowledge it, (for I was ambitious,) yet I was compelled to call my friend to a stand in the midst of my swath. I said, 'Mr. Picket, (for that was his name,) if you know any thing which you can communicate to me of the skill of mowing,

I beg of you to do so, for I am exhausted, and I may as well confess at once that I cannot keep up with you.' He stopped, came back, took my scythe, and explained to me the main governing principles. I adopted them, and in less than one hour I could keep up with him with perfect ease. Indeed, I had at least 20 per cent. more of physical strength than he had. It was science alone that enabled him to lead me to this extreme. During the following summer I came in contact with about a dozen good mowers, and I may say some three or four of them professedly *fast* mowers. I adhered strictly to the science I had learned the preceding summer. My professor not being present, I could lead the field with great ease; but I kept the secret to myself. And now for the art: I will try to describe it. 1st. The scythe should hang natural and easy, and, as I have said before, it should be kept in first-rate order. 2d. As you approach the standing grass let the heel of the scythe move to the very point of commencement, and let it stop the instant it has done its work. Thus there is nothing lost by a backward or forward swing. If the grass stands up so as to admit of moving on, measure with the eye the utmost capacity forward of your scythe; take a quick, easy gait, moving your right foot well up towards the standing grass, and your body with it, though leaning back by bending the knees a little forward, so as to bring your whole weight to bear upon the scythe without twisting the body from right to left, as many do; thus giving ease to each clip, and ability to repeat in an advanced position without fatigue.

"Note.—If you swing six inches too far back, and six inches too far in pointing out, it makes 24 inches *loss!* This applied to a scientific forward motion, will give you a great gain on ordinary mowers."

The Boston Cultivator contains a description, by Benjamin Willard, of a method of *recovering pastures*, which he says is very useful, and can be applied without manure. His account is thus presented: "This is to turn them over the last of July, or as soon after as business will permit, and sow two bushels of rye to the acre, and bush in the grass seed. I sow one bushel of plaster to the acre after the rye is up; and when it is well up I turn on sheep. In the spring, I again dress it with plaster, and give it one bushel of red-top to the acre, and keep sheep enough on it to prevent its rising till the last of May; then cattle may be put on if desired. It will last through the summer, and produce abundantly till the grass is well rooted. Pastures thus treated will look surprisingly verdant, and will last several years. Nothing suits sheep and calves better than the rye. The same course may be pursued with exhausted land or bushy pastures. I prefer to keep sheep there the first year, as they keep every spire of it close, and thus make it spread, and they manure it more equally than cattle, and do not injure the grass, in its tender state, with their feet."

In the Quarterly Journal of Agriculture of the Highland and Agricultural Society of Scotland, we find mention of two new species of clover, (which are described as follows by M. Vilmorin, in the *Bon Jardinier;*) one of which is the hybrid, and the other the elegant. The elegant clover was for a time considered identical with the hybrid, which is cultivated in Sweden; but when growing together, the differences are stated to be striking. "The latter is larger in all its parts than the former, and the color of its flowers is a brighter rose, shaded with white in the centre, while the elegant trefoil has rather dull reddish rose-colored blossoms alike in every part of the flower-head. The appearance of the herbage is different; the hybrid clover has

dark and bright foliage, and that of the elegant is pale and unequal; the leaflets of the latter are also marked with a brown band, like common clover, which is not the case with the hybrid. Another character of the hybrid is, that in the summer, when it begins to shed its blossom, and during autumn, the root throws out fresh foliage, arranged like a rosette; but in the elegant trefoil this does not occur. It is the lateral branches which rest on the ground that supply the verdure. The hybrid trefoil also flowers fifteen days earlier than the other; which, however, lasts the longest and branches more. Lastly, the former is taller, more beautiful, and comes in earlier; but when the latter has arrived at perfection, having more numerous stems, well covered with branches, and more solid, it will yield, when mown, as great a produce as the former. The hybrid trefoil has been a great deal used by M. de Kruns in the formation of artificial fields at Orebo, in Sweden, and it has succeeded well; it has grown from three to four feet high, and has yielded, during about 20 years, often more than 10,000 lbs. per tunnland, (about 1¼ acre English,) and always upwards of 5,000 for the first 10 years. It is looked upon as a plant equally suitable for mowing and for pasturage; strong moist soils, argillaceous or calcareous, suit it well; it frequently comes spontaneously on lands in Sweden that have been drained. The elegant trefoil is found in abundance on poor clayey strong soils, where it grows thick and vigorous. It is wild in France in many places; not unfrequently in ferruginous sand. It seems very probable that the species will one day form valuable additions to our forage plants, as they appear as though they would succeed on lands unsuitable for clover, lucerne, and sainfoin."

An interesting statement respecting the productiveness of Italian rye grass as an early spring feed for horses is found in the Mark Lane Express, as communicated to the Newcastle Agricultural meeting, by Mr. Dickinson. He says that his land, a strong clay in good heart, and underdrained, is finely pulverized during the summer months, after tares, or any early crop of corn. This he sowed broadcast, with grass seed, four bushels to the acre. Harrowed it lightly with bushes, as iron harrows bury the seed too deeply. It was cut the first time in 1844, the first week in March, with about ten inches of grass; April 13, the second time; May 4th, the third time; May 24th, the fourth time; June 14th, the fifth time; July 22d, the sixth time, with ripe seed, and three loads of hay to the acre. Immediately after each crop, the land was watered with two parts of pure urine and one part of water; the produce of each crop increased with the temperature of the atmosphere from one load to three loads per acre. He also had three or four more light crops, the ground having been harrowed with iron harrows, but without manure as before. In 1845, his first cutting was April 6th; second, May 3d; third, June 9th; fourth, 2½ feet long standing in the land, July 12th. He states that the Italian rye grass differs in quality and variety; there are some that bloom at a foot and a half high, but his was of a kind which stood from four to five feet. A Mr. Hunt also used the same kind, sowing the seed which he had from Mr. Dickinson; an acre the 1st of September, 1844, after a crop of spring tares. He manured his ground with ten loads of good horse dung. The second week in April he states that he began to feed it off with ewes and lambs, and they made quick progress, especially the lambs, as the grass produced an abundance of milk. There were forty two couples, and the grass supplied them weeks; giving the ewes chaff and oats, and the lambs peas. They then began again to feed it for want of other food. He took them off from the grass on the 13th of May,

and on the 18th of June mowed the whole for hay, which produced nearly two loads to the acre; this was about five weeks' growth. He adds: "I am satisfied of its being the most valuable plant I know of, especially for early spring feed; it comes to perfection for feed quite as early as rye, and the comparison between the two for feeding qualities is as ten to one in favor of the Italian rye grass." The brown or dark colored, which has a more fibrous stem, is stated by Mr. Rodman, in the Royal Agricultural Journal, to be better than the pale. The last report (appendix No. 28) contained a full description of the Italian rye grass.

A writer in the Cultivator of July, 1845, from Tuscaloosa, Alabama, recommends lucerne, Guinea grass, clover, herdsgrass, and rice grass, as suitable for the south, and urges the cultivation of them upon the attention of the planters of Alabama, &c. He says: "During the winter, I have seen bundles of *northern* hay brought to the stables of my neighbors, which had paid for carriage many hundred miles round the capes of Florida and through the Gulf of Mexico, and five hundred miles by the course of the river into the interior. This is a *standing reproach* to the agriculture of the south." His letter may be found in the appendix No. 7.

The results of an experiment given in the Journal of Agriculture for the purpose of proving the best depth for burying the different kinds of grass seed, show that grass seed is usually harrowed too deep in the ground. The condensed account of the same, as taken from the Cultivator of February, 1845, may be found in the appendix just mentioned. We have also added to the same appendix a paper on the proper time for cutting, and mode of curing grass for hay, giving the opinions of different persons in the agricultural meeting in Albany in the early part of 1845. These are valuable, as embodying the experience of scientific men and practical farmers.

HEMP.

The crop of hemp is almost confined to a few western States. The estimate of the last year, as appears from the letter of Thomas D. Forman, Esq., of Louisville, Kentucky, contained in appendix No. 8, was not sufficiently large. We have taken that which he offers mostly as the basis for the estimate of this crop in 1845.

The notices respecting the hemp crops of Kentucky are as follows. In June: "We learn that the hemp crop of this State and Missouri is in a most promising condition, and bids fair to be greater than in any previous year."—*Louisville* (*Kentucky*) *Courier*.

Later in the season: "We understand that in some neighborhoods the present hemp crop is very deficient both in the quality and quantity of its lint; so much so that it is believed that it will not average one-third the usual crop."—*Lexington Inquirer*.

The crop is variously estimated by others, from whom we have derived information, at from "25 per cent. to one-third more" than the crop of 1844. The following gives an account of the receipts at Maysville: "The receipts of hemp in the Maysville market for the month of October, including a small amount from one of the establishments not hitherto reported, amount to 693 tons; making the total received, shipped, or manufactured for the ten months of the year 1845, up to the close of October, 5,008 tons. We suppose that the amount which will be received in the months of November and December will swell the total receipts of the year to 6,000 tons.

The Hon. A. Beatty stated in a letter last year (see report for 1844) that the receipts at Maysville would comprehend one-third of the hemp crop of Kentucky. The accounts respecting the hemp crop from Missouri are encouraging. We have supposed it to be increased.

A variety of papers regarding the culture and preparation of hemp, &c., will be found in appendix No. 8. Another, also, containing an account of Mr. Billings's mode of culture and preparing it, may be found among the articles in appendix No. 1, mentioned in the letter of Hon. H. L. Ellsworth. Another still, translated from a German journal, contains a description of a mode practised in some parts of Europe, by which the process of preparation by water-rotting is rendered comparatively easy, and the time consumed in the process is very considerably shortened. This, perhaps, still remains the great desideratum to ascertain the best and cheapest method of water-rotting it, so as that it shall compete with the Russian hemp. The modes of breaking it without rotting are all more or less liable to objections on account of injuring the fibre; and numbers of machines for this purpose, respecting which sanguine views have been entertained, have been discarded, on their application to general practice, as unsuitable for the object. The trials which have been made of American hemp, in comparison with Russian, during the past year, it is believed have resulted in satisfactorily demonstrating that the former is fully equal, if, indeed, not superior to the latter. The following scrap from one of the public journals presents the comparative strength of cordage manufactured from the hemp of Indiana, Kentucky, and Missouri. "The experiments, 100 on each kind, of similar appearance and like cleanliness from each State, were made at the navy yard in Boston, and they were made on rope $1\frac{3}{4}$ inch in circumference, viz:

	Indiana.	Kentucky.	Missouri.
Test - -	4710	4474	4195
	4700	4082	4160
	4896	4272	4192
	14306	12828	12547

"Mean strength of Indiana, $4768\frac{2}{3}$; Kentucky, 4276; Missouri, $4182\frac{1}{3}$. The usual test of Riga is 4400 to 4900. It would seem from these trials that the Indiana hemp was nearest the test."

Again: "Experiments were made at Louisville, Kentucky, a few days ago, with a machine for testing the strength of cordage manufactured from hemp, which showed that American hemp, instead of suffering by a comparison with the Russian article, gained by the investigation. In the test of larger cordage, the Kentucky article sustained a much greater weight than that imported from Russia."—*Philadelphia Daily Chronicle.*

The results of the experiments just referred to, and other similar information, will be found stated in the letters of Mr. Sanders, hemp agent, which, with the instructions of the honorable Secretary of the Navy, and several articles from the public journals relating to these subjects, are subjoined in appendix No. 8.

A statement respecting the profit of raising hemp is furnished in the St. Louis Republican, which we quote at this time for the purpose of showing that this crop deserves still more attention than it has yet received: "The

St. Louis Republican says that Mr. T. Longwith, a farmer in Scott county, Illinois, who has, for two or three years past, water-rotted his hemp, and bestowed great care upon it, last year kept an accurate account of the cost of cultivating and preparing for the market the product of 8 acres, including the rent of the land, cost of seed, labor, and expense of getting it to market; and the result was a net profit of $213 38. In estimating the cost of labor, a man's wages was charged at 75 cents per day, and an ox-team at $1 50 per day; but the most of the labor was done by himself and son, and the only outlay paid in money for extra hands and transportation was about $40. The product of the last year's crop from the 8 acres weighed 6,300 pounds, and was sold a few days ago in the market at $115 per ton. The year before he sold his crop here at $125 per ton. He sent a sample of his hemp last year to the navy agent at Boston, who, after testing it, pronounced it, in strength and texture, equal to the best Russian hemp. We must remark, however, that his is the best article which we have seen in this market; but we are assured by him that hemp equally as good can, with proper care, be produced in other parts of Illinois and Missouri."

"Some hemp has been exported to England; but it does not promise a very remunerating price, as we learn that it sold for only £20 to £25. It is, however, well spoken of in the English papers." "The American bark Westheag, which arrived at Dundee, Scotland, in the early part of this month, brought a quantity of hemp, intended to be used for purposes to which flax has been only hitherto applied. It is said to make very excellent yarn of small sizes, but it is feared that it will not bleach so well as flax. The price is so low that it stands the spinner considerably less than the flax, even after the expense of softening (£4 to £5 per ton) has been added. We understand that Mr. Sharp, of Dundee, holds a patent for softening the article prior to its being used by the spinner." Again: "A house in this city, during the past summer, made an experimental venture of fine hackled hemp, by taking out of each 100 pounds 50 pounds of tow, and sending one parcel to Boston, one to New York, and one to Liverpool. That sent to New York was sold early, before the price declined, and brought $170 per ton; that sent to Boston was sold recently at $140 per ton; and that sent to Liverpool is not yet sold, but they are advised by the steamer Great Britain of its arrival, with the following "broker's report," viz: 'Seven bales hemp, good quality, picked and pretty even, worth £21 per ton.' £21 sterling are equal to $101 50, at the present rate of exchange; from which deduct the freight and charges, and there remains but about $45 per ton; whilst that sent to New York netted about $140 per ton, and that to Boston $110 per ton. These $45 are for a ton of hackled hemp; to produce which, two tons of hemp from the farmers were used, worth $130. The tow which was hackled out was worth about $40 per ton; thus making $90 as the cost of what was worth in Liverpool net $45. Nor will hemp in its rough state do much better. As we recently stated, another individual sent some to Liverpool that cost him $62 50 per ton, by which he will lose about $23 per ton."—*Dollar Farmer.*

An account is given in the St. Louis Missourian of a kind of wild hemp found in Missouri, which seems to deserve attention and further investigation. We have not met with any other mention of it. The St. Louis Missourian says "that wild hemp has been found in that State. A farmer from St. Louis county, being in Captain Jenks's hemp warehouse, accidentally saw some Manilla hemp; made inquiry what it was; and, on being

informed that it was Manilla hemp, said he had produced something exactly like it from a weed on his farm, and that he would send in a sample, which he did; and it proved to be a variety of the Manilla hemp, resembling most the New Zealand hemp, but it undoubtedly belongs to the same genus as the New Zealand, Sisal, and St. Domingo hemp, from which all our heavy cordage is made. If this can be found in any quantity, it is a most valuable discovery." The Bear grass is also highly recommended for the same purpose.

Although we have not included *flax* in the tabular estimate, yet it seems suitable to add a few things respecting this article in connexion with the consideration of the hemp crop. The late invention of Mr. Billings, which is applicable to flax as well as to hemp, promises to render this crop more an object to our farmers. Flax is raised also for the seed, in some of the States, in large quantities. This is the case in parts of central New York, where the increase the past year has been 50 per cent. over the crop for that purpose of 1844. A writer in the Cultivator of April last, 1845, from Waterloo, Seneca county, says: "The success of the Seneca county farmers in making the flax crop a succedaneum for the sun stricken fallow, has induced many farmers in the neighboring counties to adopt its culture." Ohio, too, seems to be prominent in such a culture of this plant. An estimate is furnished in one of the public journals which shows that much success attends its cultivation in parts of the great western State of Ohio. Thus, it is said:

"*Flax seed.*—On the opening of the season a good deal of interest is felt in relation to the crop just harvested. The following, taken from the Eaton (O.) Register, is to the point: 'This article bids fair to rank among the most staple commodities of the farmer in this part of Ohio. For the last two years the farmers of Preble county have paid particular attention to the raising of flax seed. The crop this year is about an average one—the drought in the early part of the season injuring the crop somewhat for seed, and still more for lint. Mr. Denny, who is engaged in the purchase of seed, has furnished us with about the probable number of acres, &c., raised in the county this year. Take the county over, it will average ten acres to every section. This would make the number of acres raised, there being 432 sections in the county, 4,320. Calculating eight bushels to the acre, would make 34,560 bushels, which, at 80 cents per bushel, would bring to the farmers of Preble county this year, for this commodity alone, the sum of $27,648.' The above estimate is undoubtedly low enough, not only in the number of acres and average yield, but in the price." Of Cincinnati it is stated: "The manufacture of linseed oil has also here assumed considerable importance, there being six extensive oil mills, which, together, are estimated to use about 150,000 bushels of flax seed yearly. This, at seven quarts of oil to the bushel of seed, will give upwards of 260,000 gallons of oil. The oil cake is principally sent to New Orleans, and there shipped to Liverpool."

A number of interesting articles relating to flax may be found in the appendix No. 9, on this subject. It has generally been believed that flax is an exhausting crop; but a writer quoted in the American Agriculturist holds the contrary opinion. Whether or not the view taken is admitted to be correct, it may at least deserve some investigation. In a paper read by Dr. Kane, before the Royal Irish Academy, he attempted to prove that in the production of the fibre no exhaustion of the soil takes place; that sub-

stance being exclusively composed of organic matter, derived from water and the atmosphere. He says that in this respect the fibre differs from the woody system which surrounds it, as the latter, by combustion, yields a considerable quantity of ash, consisting of inorganic compounds, derived from the soil. The woody part is not removed from the farm, being of little value. The proportion of inorganic matters contained in the seeds is very small, compared with its entire bulk, so that, if consumed on the farm, flax is not an exhausting but a restorative crop."

The same opinion is expressed by G. Nicholls, esq., in the Royal Agricultural Journal of England. He says: "It has often been said that flax is an exhausting crop, but it certainly is not more so than many of the usual grain crops, nor does it require a very rich soil. Indeed a rich or highly manured soil is injurious, causing the plant to grow too strong and luxuriant, and rendering the fibre coarse and less valuable. Flax is grown on light poor land in Belgium and Holland, and I have seen it growing on mere bog in Ireland."

In the Mark Lane Express of July 18, Mr. Warner says that, under the improved system, the seed of flax is preserved without deteriorating the fibre, and thus the crop is rendered doubly valuable. It must, on no account, be mowed or reaped, but pulled up by the roots. The best criterion for judging of the proper time for pulling it is precisely when the major part turns yellow, and the kernel of the principal ears brown. It is better to begin too early than too late. The method of pulling is merely to collect a small quantity in the left hand, and to pluck it with the right hand, placed about half-way down the stalks. The hands thus being quickly filled, it should be neatly spread in even rows on the ground. In the course of a day, or as the weather may be, turn it with a stick. When dried to the state in which hay would not heat in the stack, tie it in small sheaves about two feet in circumference, and put it in a barn or stack it. If tied up before dry, set it up in the field, pull out the weeds, tie long and short stalks in separate sheaves, &c.

The subject of flax was discussed also in one of the meetings of the Farmers' Club, in New York; and we have given some extracts from some of the opinions there expressed, in appendix No. 9.

The papers read before the society for the improvement of flax culture in Great Britain, as they are contained in the agricultural papers of that country, have presented many important facts in relation to this crop. One containing directions for its culture and management we have inserted in our appendix No. 9, from the American Agriculturist of November, 1845. In some of the foreign journals, also, we find statements respecting the statistics of flax, which may be useful for reference. The yearly product of flax in Belgium is 2,560,000 cwt., three-fourths of which is from the two Flanders. The value of this harvest is said to be $3,400,000, and for it there is required 15 to 17,000 acres of land. By breaking, rotting, and drying, the weight is lessened one-half, and it then equals $4,000,000 in value. By swingling and hetcheling, the weight sinks to 360,000 cwt., but the value is thus increased to $6,720,000; so that by the continued improvement of the flax it doubled in value by each process. The amount of flax and tow imported into the United Kingdom of Great Britain is stated by a writer in the Journal of the Royal Agricultural Society to be, according to Parliamentary returns, 1,437,150 cwt. This is derived principally from Russia,

Prussia, Holland, and Belgium. About 100,000 cwt. of hetcheled flax is exported from Belgium to other countries.

An interesting letter on flax and the linen statistics of Austria, furnished by Mr. Fleischman, may be found in appendix No. 9, extracted from the Washington Union.

A species of flax, called the Chinese flax, has been mentioned in some of the agricultural periodicals as furnishing goods which resemble French cambric, having a silky appearance, and which, it is stated, possesses more valuable properties than flax, owing to the length of staple and strength of fibre. It has been suggested as a valuable staple, which might be added to our products, but we have seen no particular description of it, or of its habits, culture, &c.

In Dingler's Polytechnic Journal for July, 1845, is an account of a new spinning plant, a species of *urtica* or nettle, which is stated to have been brought from China to France, and which is recommended there for trial.

TOBACCO.

It is believed that increased attention is paid to the culture of tobacco in some of the New England States, though they cannot in any proper degree be considered tobacco growing States. The fertile lands in the Connecticut valley, from Hartford up to Northampton, have within a few years, furnished very respectable crops of tobacco, and the produce of the crops there is said to be very good for the manufacture of cigars. The following are some of the notices we have gathered respecting it in the two States of Massachusetts and Connecticut, and by which we seem authorized to infer that it is a profitable and increasing crop in that section of our country.

The Springfield Republican (Massachusetts) says: "The cultivation of the tobacco plant has been very largely entered into in this town and vicinity within a year or two. One gentleman of this town has 26 acres of it this season. When successfully cured it proves a very profitable crop, but its cultivation requires much care, and it exhausts the soil in a large degree."

A correspondent of the Brooklyn Gazette says: "Tobacco is getting to be a great article in agriculture all along the valley of the Connecticut, and it is said there is no land in the world that will produce so good and as much per acre as our land will. I have about three acres growing for the first trial, and if it prove a good crop I shall continue the cultivation of it."

A correspondent of the Dollar Farmer (Ky.) says: "Though the season has been dry, the tobacco crops in Connecticut, I think, are much heavier than any I have seen in Kentucky. It is planted very thick—2 feet one way by 30 to 32 inches the other—thick planting being requisite for good cigar leaf. To this secret of thick planting the Mason county (Ky.) tobacco is indebted for its celebrity; and it is worthy of note that the secret was brought out to Kentucky by some Connecticut tobacco buyers. 2,000 lbs. of tobacco to the acre is said not to be unusual in Connecticut."

Again, in the New York Farmer a correspondent says: "As the growing crop of tobacco is receiving attention and is raised to good profit, I must give you an estimate of the cost to raise one acre, made by myself, with the help of friend L.; and he should know, as he has several acres which average one ton per acre, and sells at Warehouse Point for eight cents per pound, or $160 per ton. Mr. L. says one ton per acre is a good crop, and probably more falls short than comes up to it. Now for the estimate:

Use of one acre of land, one year			$15 00
10 carts of manure at $2 50	25 00	one-half is	15 00
Carting and spreading,	5 00		
Ploughing twice			3 00
Harrowing and marking			1 00
7,000 tobacco plants, sold at 50 cents			3 50
Holeing and setting plants			3 00
Hoeing 4 times			5 00
Extra attendance to secure and kill worms			2 00
Topping and securing			4 00
Cutting and hanging up to dry			4 00
Stripping from stalk and packing			5 00
Rent of shed to dry in			4 00
Freighting to Warehouse Point			3 00
			67 50

"Now, $67 50 from $160 leaves a net profit of $92 50 per acre. Now, what crop other than tobacco would make so good a return? This is a fact worthy of consideration."—*Northampton*, *November*, 1845.

The increase in these two States, we believe, may fairly be estimated at 20 per cent. over the crop of the preceding year.

In New York, tobacco was not included in the returns of the late census, and therefore we are unable to form any tolerable estimate respecting it. In Pennsylvania, in the tobacco district, which lies principally, as appears from the census returns, along the Susquehannah river, there seems to have been a small gain. The early accounts respecting the tobacco crop of Maryland were very discouraging. We subjoin a few of the notices gathered on this subject. The tobacco growing region lies principally on the western side of the Chesapeake bay, and includes Prince George, Calvert, Charles, and Anne Arundel counties. In April, the Upper Malboro' Gazette, Prince George county, says: "For several days past the weather has been cold and blustering, and serious apprehensions are felt for the plants of the second sowing of tobacco seed. The first was killed some weeks ago, and the beds re-sown. A continuation of this weather for any length of time must so far retard the plants as to render a short crop inevitable."

Again, in May: "The prospect for a tobacco crop is rather gloomy at present. The fly is making sad havoc with the young plants, and will continue to destroy them so long as the harsh weather continues. This time last year many farmers had commenced planting their crop; now, we know of some who were sowing their seed for the third time on the first of this week. The crop must be far below an average one." The Leonardtown Beacon, in July, speaking of this crop, says: "The tobacco crop, we think, will fall short of the crop usually raised, but not to that extent which was at one time anticipated. The rains which have recently fallen have had a very beneficial effect upon the tobacco planted late, which now bids fair to make the farmer ample returns for his labor. It is impossible, though, we think, that this tobacco can cure well, as it must necessarily be cut in a green state; the season being now too far advanced to admit of its ripening. The most of that which was planted early in the

season has been already cut and housed, and the rest will be sufficiently ripe to cut in the course of a few days."

The American Farmer also says: "The tobacco plants severely suffered by the frosts and drought, but the very favorable weather which the planters have enjoyed since the middle of June will, we trust, have caused a decided improvement in their prospects of a crop of this great staple of Maryland and Virginia." Yet later—the accounts are in October. The Port Tobacco (Maryland) Times says: "The tobacco crop, from what we learn, has been with us an average one, but we are apprehensive that the hasty manner in which some of it was housed, and the recent wet and unfavorable weather for curing it, may have had a tendency to change its complexion." The St. Mary's Beacon of the 23d says: "We understand that several of our farmers had their tobacco seriously injured by the frosts which fell during the early part of last week."

The Marlboro' Gazette of October 17 says: "Last Thursday, Friday, and Saturday were very unpropitious days for the tobacco crop. Almost every one had housed their crop, and the close, damp, and rainy weather at this stage of curing soon rots it. Friday, in particular, was most injurious. We have not learned the amount of damage, but it cannot be inconsiderable, judging from the quantity recently carried to the house; hurried there, in many instances, from a fear of frosts. Fears are entertained that the unfavorable weather for curing tobacco in Charles county, and the frosts in St. Mary's, have seriously injured the crop." We are informed, however, that a larger quantity than usual has been inspected in the Baltimore market. The American says: "The quantity of tobacco which will be inspected at Baltimore the present year will exceed 60,000 hogheads; a larger amount than was ever inspected at Baltimore in any one year, and about double the average of inspections from 1825 to 1828." Notwithstanding the apprehensions expressed therefor, we believe that the crop was considerably larger than that of the previous year, which, it will be recollected, fell off from that of 1843. The omission of the millions in the table for this State the last year, (a clerical error, which was corrected in most of the printed copies,) will be recollected. We have restored the proper numbers in the present estimate.

Virginia is among the foremost tobacco growing States; but for a few years past the crop in this State has not been so successful as formerly. The early notices respecting its appearances the past season were unpromising. Thus, the Petersburg Intelligencer of April 15, speaking of the frost and cold winds, says: "The second sowing of tobacco will produce but few plants, and a third must generally be resorted to."

So, in May: "Great complaints, too, have reached us in respect to the tobacco plants. Many planters indulge the apprehension that the injury is irreparable, and that under the most favorable circumstances not more than half an average crop can be reasonably anticipated."

The Richmond Compiler says: "There was at first, as is usually the case, an alarm about the scarcity of tobacco plants. It is now thought, however, that there will be generally enough to plant the crop. Plants are more abundant than they were last year. There was great complaint on Dan river last spring; we learn that there is very little now."

In July, also, a correspondent of one of the public journals, under date of Richmond, states: "With regard to the tobacco crop, many doubts are entertained, on account of the want of rain. Reports from the counties between this city and the Blue Ridge are very discouraging. Not one in

a hundred of the tobacco planters have this year put in the ground more than one-half their usual quantity; and that is perishing from the drought. The region of country above alluded to is one of the principal tobacco districts." "The tobacco crop, the Virginia papers say, must necessarily be short; not more than half a crop has been planted, and the want of sufficient seasons has caused it to *stand* badly, and but little will be topped before August. The Lynchburg Virginian says that many planters in that region have been unable, for want of a season, to plant as much as usual; and no small quantity of that planted has since died, or has been materially injured." In August we meet with conflicting accounts.

Thus, the Richmond Whig of the 28th says: "The tobacco is in very many cases the largest ever known or seen; and, by its unusual size, will bring up the crop to an approach to average far beyond anticipation."

Other journals speak very discouragingly. Thus, a letter from Albemarle county, dated the 25th, states that, on account of the drought, "the tobacco crop will be very light indeed. Some of the farmers have been obliged to send 40 miles to supply their farms with meal."

Again: "The tobacco crop will be, beyond all question, a short one. In the counties below us, as well as here, the planters did not succeed in getting an average crop planted; and since it was put in the ground the season has been most unpropitious. The plant is now becoming prematurely ripe in many places; and in others, the bud has been blighted by the excessive heat of the sun. There can be no doubt but that there will be far less than the usual crop brought to the house."

In September, also: "The Virginia tobacco crop is likely to turn out small; not one in a hundred of the tobacco planters in the best tobacco growing region have planted more than half their crop, and that is perishing from the drought."

"A Charlottesville letter, published in the Richmond Whig, says that the tobacco crop in Buckingham, Amherst, and Nelson counties, Virginia, will not exceed more than half the usual yield. Albemarle, it is also stated, will fall short one-third."

Still later, we are told by one who has traversed the valley country—"The most sanguine do not count on half a crop of tobacco. Some neighborhoods are worse than others; but all are bad; and from numerous inquiries, I fear it is generally the case in Virginia, between the Blue Ridge and the head of tidewater."

Again: "From all I can learn, I am satisfied that there will not be more than half a crop of tobacco in Virginia this season. The season was unusually unfavorable for planting, and hence the stand is greatly less than what it otherwise would have been; and then, from the dry weather, the yield from what is standing will be small. The recent rains have been very copious, and will prove very beneficial to the tobacco and to the later planted corn. I observe some tobacco planted since the rain, and this, with a late fall, will yield well." The Lynchburg Virginian says, that "a great deal of forward tobacco that had been cut and hung in the open air for the sun-curing process was injured, and some of it destroyed by the heavy rains on the 10th and 11th October."

In the Southern Planter for October, we find similar estimates: "The growing crop of tobacco in Virginia must, we presume, from the nature of things, be a very short one. The early season was very unpropitious to the growth of plants, and every man that had cabbages to set out knows

that it was almost impossible to obtain a 'stand.' The drought must have seriously affected those plants that did live, and we greatly fear that the August rains were very productive of fire and rot. From what little we know of the crop, we should imagine that, take it through and through, a worse season could hardly, in the course of nature, occur again."

Again, from a correspondent of the same journal, who writes from Mecklenburg: "In relation to the amount of the tobacco crop planted, you will have a variety of statements. The general opinion here is, that not more than half a crop was planted till the August rains set in; that part cannot make tobacco. The first plantings are very badly missing, but have improved surprisingly, and now promise to make good tobacco if we have a late and favorable fall."

Our other information is of the same cast, generally. Thus, one writes to us respecting the eastern central section of the State, lying east of the Blue Ridge: "The crop will scarcely reach half the usual average. Plants, owing to the late frosts and dry spring, were very scarce, so that but little (if any) more than half the usual crop was planted. The plantings, too, were unusually late, so that there is much danger even yet, (October 6th.) A large quantity must be cut in order to save it from frosts. Upon the whole, I feel very certain, after very particular inquiries, that the crop will not, as before observed, reach the usual one." Still further to the east, the decrease is estimated at "25 per cent. less." In the central southern section it is thought to have fallen off as much as "33⅓ per cent.," and in the northwestern corner of the State to have been "one-fourth less" than the crop of 1844. Although the crop was much less than an average one, yet the fact must be taken into consideration that it has decreased largely for a few years past. The decline, then, from the past year's crop, may not exhibit so large a falling off as it otherwise would. We believe that, on the whole, it has not fallen off more than about 15 to 20 per cent., if even this decline may not, perhaps, be too large.

The tobacco crop of North and South Carolina suffered also severely by the drought, and in some places fell off 25 to 30 per cent. The millions omitted by a clerical error in the table of the last report, for North Carolina, have been restored. In Georgia, the injury appears not to have been equally great; and in some parts of this State, we are informed there has been increased cultivation of this product. The crops in the northwestern part of the State have been good.

More attention is now paid to the culture of tobacco in Florida. The following statements are gathered from the public journals in relation to this subject:

"*Tobacco in Florida.*—The low price of cotton last year induced the planters in Walton, Washington, and other counties of Florida, to raise tobacco; the result was so favorable, that this year they are going into the culture on a large scale."

Again: A letter recently received from Florida shows that this new member of our family of States is about to set up a rivalry with old Virginia, as to which is to be hereafter the tobacco State of the Union. It says: "Every body here is going into the tobacco culture, which promises to replace the orange, as it requires no machinery, and the poorest can engage in it. The experiments that have been made, notwithstanding the worst season ever known, have proved extremely encouraging. The article is of a superior quality, and commands a high price in New York—from 40 to 80 cents.

H——, who has just arrived from thence, states that the choice qualities will command this latter price. There will be much done in it here the next year; and there is every prospect of its becoming the staple of Florida." We have felt justified, accordingly, in giving a very considerable increase to the tobacco crop of Florida. It is stated in some of the public journals that 1,000 to 1,500 pounds have been raised on an acre in Tallahassee."

There has been some increase, also, in the crops of Alabama and Mississippi.

The tobacco crop of Tennessee, in the northern part of the western district, as we are told in July, was very promising. In some portions of the State, however, it was more unfavorable. At a later date we learn that there was about an average crop in the State, which, as the crop of the preceding year was also an increase on that of 1843, we suppose will give a moderate gain.

The early accounts of the tobacco crop of Kentucky were unfavorable. The late frosts in the spring, it was thought, would so greatly injure the crop as very much to cut off the hopes of the planter. Thus we find it stated in April:

" *Green river (Ky.) tobacco crop.*—The last number of the Hopkinsville Gazette has the following: 'The heavy frosts and cold nights of Monday, Tuesday, and Wednesday last, have, we are informed, injured the young tobacco plants terribly. One gentleman told us that his were all killed, and that he had burnt new beds and sowed again, but without expectation at this time of the season of being able to raise any plants. Should this be the case generally, (and, as the ground was frozen half an inch or more, we see no reason why it is not,) the tobacco crop of this section will fall short immensely.' "

Again, the Maysville Eagle of May 24 says: "The scarcity of tobacco plants, even if the season for planting be not too far advanced, will operate to produce a short crop in this region."

The crop, however, proved better than had been anticipated. In some places, indeed, it was only tolerable, while in others it is said to have been "very good—in quantity perhaps not quite equalling that of the last year," but in quality surpassing it, and in value fully equal to it. The planters, we are told, "do not *fire* their tobacco as much in curing it as formerly." There are several stemmeries in the State, in which large quantities are stripped and prepared for the British market.

In parts of Ohio considerable attention is paid to the cultivation of tobacco. " The editor of the Liberty Advocate, of Cadiz, Harrison county, says that in passing through Guernsey county, he was much surprised to see the vast amount of tobacco raised by the farmers. Almost every farmer had his tobacco, and a great many paid little or no attention to any other branch of agriculture, on the ground that no other work so abundantly repaid labor." In Miami township, we are informed that there was raised 200,000 pounds; and in the southwestern section of the State the increase is estimated at "25 per cent. more" than in 1844. The crop may have been from 10 to 15 per cent. more.

The same was probably the case in Indiana and Illinois. Indeed, in some parts of these States, the increase is thought to have been as high as "20 to 30 per cent." This, however, would probably be too great an average for the whole State.

The earlier statements respecting the tobacco crop in Missouri were most

unpromising. Thus it is said in the St. Louis Era, May 5: "Those engaged in the tobacco cultivation have had a good opportunity to put their ground in a proper state of preparation, but the planting season of that crop has not yet arrived."

As the season advanced, however, the prospects brightened; as we learn from the St. Louis Republican, of July 2, that "the crop of tobacco is better than was anticipated in the early part of the season." Yet, in some sections, there was not the same success in its culture. The Hamilton Journal of July 24 says: "The tobacco crop in this section, so far as we can learn, is next to a total failure; owing, we believe, to the fact that the early part of the season was so dry that it was impossible to rear the plants. We are informed, however, that further in the interior, and on the Missouri river, the prospect is more flattering." The Fulton Telegraph also says: "We should not speak of a tobacco crop in Missouri this year at all; there is an almost entire failure in plants; there are loud complaints."

In September the Glasgow Pilot says: "The tobacco crop, which has been very promising in this neighborhood, is very much injured recently by the tobacco worm, which is more destructive than has ever been known here. We have ridden by several fields of tobacco, the leaves of which are tattered by them as if cut up by a severe hail storm. The old ground seems to suffer most."

Again: The St. Louis Republican of the 12th instant says: "We are sorry to hear dismal accounts of the coming tobacco crop in this State. In many if not most of the counties on the Missouri there has been a very general failure of the plants in consequence of the cold and unfavorable weather; and those who persist in attempting to raise them must rely on the most favorable aspect of the weather to bring them to maturity. In Franklin county, noted for the production of our finest tobacco, the planters are substituting corn, and elsewhere others are putting in hemp. Unless a very great change takes place in the prospect, there will be an almost entire failure in the tobacco crop. Timely rains have improved the prospect in the country bordering on the Mississippi." There was, on the whole, probably an increase, though not large, as there was a considerable falling off the year before.

The whole tobacco crop, therefore, for the United States, may be estimated at 187,422,000 pounds; which is about an average crop, as it is nearly 10 per cent. above that of the year before, which probably did not equal an average one.

The quality of some of the crop is spoken of as fine. Thus one of the public journals says: "We clip the following from a St. Louis paper, from which it will be seen that there is an advantage in raising good tobacco as well as good anything else. 'The first premium for the best manufacturing tobacco, at the planters' warehouse, a few days since, was taken by Samuel Jeffries, of Franklin county. It was afterwards purchased by T. Campbell, of this city, for the high price of $22 25 per hundred pounds. The second was taken by W. E. Wells, of Pike county, and was bought by Price & Perry for $20 25.'"

The following statements respecting the exports of tobacco from New Orleans we find also in one of our papers, and give it, as it furnishes some idea of the progressive importance of this crop:

"*Exports of tobacco from New Orleans.*—The shipment of tobacco, it will be seen, has been nearly tripled within the last 10 years from the port

of New Orleans, and is within a fraction of the entire quantity exported from the United States in 1833—83,153 hogsheads. It has more than doubled itself, it will be seen, since 1840; thus showing what rapid progress is being made in the production of the weed in the western States. A large quantity of western tobacco also finds its way to the port of Baltimore, by the internal improvement lines. The price of tobacco in Europe in 1840 averaged $81 05 per hogshead, whilst in 1844 it averaged only $60 11. Tobacco shipped from New Orleans for the last ten years:

1835	33,801	hogsheads.
1836	41,634	do.
1837	35,821	do.
1838	31,555	do.
1839	30,780	do.
1840	40,436	do.
1841	54,667	do.
1842	68,058	do.
1843	89,891	do.
1844	81,249	do."

In one of the agricultural papers we find quoted an account of the amount of tobacco inspected at various places, including the Virginia and North Carolina crops, with an opinion respecting the crop of last season by a firm in Virginia. We subjoin it, in order to aid any one who may wish to compare it with that inserted in the former report:

"*Virginia tobacco.*—The following statement respecting the inspection, exports, and stock on hand, of Virginia tobacco, for the year ending 30th September, 1845, is published in the Richmond Times of the 7th instant:

		Inspections.	Stock.
	Richmond	21,902 hhds.	13,750 hhds.
	Petersburg	11,151 "	1,528 "
	Lynchburg	10,692 "	4,656 "
	Clarksville	2,986 "	38 "
	Farmville	3,245 "	322 "
325	Danville, Milton,		
425	Tye River,	1,150* "	150* "
400	Henderson,		
		51,126	
1150	On ship board, not cleared		1,500 Un-
	In transitu from upland inspections		500 count'd
			22,444

"*Foreign exports.*—Liverpool, 4,707 hogheads of tobacco; London, 1,187; Bristol, 664; France, 4,542; Trieste, 401; Genoa, 1,647; Bremen, 1,281; Hamburg, 435; Rotterdam, 1,365; Amsterdam, 477; Antwerp, 1,018; Rio de Janeiro, 1; shipments via northern ports, 1,000. Total, 18,725 hogsheads. To Bremen, 2,622 hogsheads stems; to Rotterdam and Amsterdam, 560 hogsheads stems; shipped via northern ports, 1,500 hogsheads stems. Total, 4,682 hogsheads stems.

* Conjectural.

"*To the editors of the Times and Compiler:*

"GENTLEMEN: We give above the statistics of tobacco inspections, stock, and foreign exports, for the present fiscal year, ending 30th ultimo. As regards the inspections, they have been increased several thousands by reinspecting reprized tobacco. In reference to stock, a large portion consists of crops inspected in 1843 and 1844, nearly all of common quality. In reference to the product of Virginia and North Carolina this year, there have been throughout the season conflicting opinions entertained. The planting in May was probably equal to about one-half an average crop. The drought early in June till the 1st of August was so intense and general as to prevent planting to much extent; yet in some neighborhoods there were occasional favorable seasons for transplanting; and such opportunities being embraced in June and July, probably made the entire planting to 1st of August equal to 35,000 or 38,000 hogsheads. From 1st to 10th August, perhaps, the plantings were equal to 5,000 or 6,000 hogsheads. Since the 1st of August the weather has generally been as propitious as could have been desired to hasten the growth and mature the tobacco crop; and should there not be a killing frost before the 20th of this month, the crop produced this year will be about 38,000 hogsheads of merchantable quality.

"Respectfully,

"JONES & BLAIR.

"OCTOBER 6, 1845."

In a letter received by the late Commissioner of Patents in March last from Dr. Muse, of East Cambridge, Maryland, well known to the agricultural public, alluding to a parcel of Spanish tobacco seed sent by him to this office, he says he has manufactured remarkably fine cigars from the leaf raised by himself from seed imported direct from Cuba—"they will equal the famous regalias." He says that he prefers the "principe" tobacco, but has never but once (seven years ago) obtained that variety. He states that his cigars from that tobacco were admired in New York, at Saratoga, and Philadelphia, and every where, by the most fastidious in taste. He sold them for $14 per box of a thousand cigars each. His crop for the year 1845 he estimated at that date would amount to 600,000 cigars, which he intended to manufacture himself on his plantation.

Several interesting papers, relating to the culture of tobacco, &c., taken from various agricultural papers, will be found in appendix No. 10. Among these is a description of the mode of cultivation in Connecticut and Kentucky, taken from the Dollar Farmer, the editor of which remarks that the same kind ("the fine cigar leaf") is cultivated in both States, though the soils are quite different. In Connecticut the plants stand about 3 feet apart, and in Kentucky 3½ feet from each other. A paper, also, on the Cuba mode of cultivation, from the Floridian, and W. W. Gilmer's (of Albemarle, Virginia) method, from the Southern Planter, and Mr. Venable's observations on the spot in tobacco, also from the Southern Planter, will be read with interest by those engaged in the cultivation of this product.

COTTON.

The cotton crop of our country is one of deep and absorbing interest to a large portion of our population. It is one which exercises great influ-

ence over our commercial progress and enterprise, and influences to a wide extent our relations with foreign nations. It is desirable, therefore, to obtain as accurate a history of its growth, from year to year, as may be in our power. Yet there is scarcely, perhaps, another crop respecting which we may not reach more approximating correctness at the period at which our estimates are made. The very fact that it is of so mighty an influence, and enters so largely into the whole foreign market of our country, renders it less easy to know what to believe of the accounts which we meet with in the various public journals. Not that there is any want of materials, such as they are; for the notices of the crop are most frequent. But the difficulty lies in ascertaining what reliance may be placed on them, and how far the different, and often conflicting reports, must be set down as designed to subserve private interest. Such materials, however, as we have, we have endeavored to apply; and if we have failed sometimes in drawing conclusions, we believe that the same difficulty would be experienced by almost any one, and perhaps many would not be even as successful in approaching to the true state of the case. From all that we can learn, the aggregate of the crop, as estimated last year, was nearer to the annual report finally made up from the receipts at the principal ports than were the conjectures of many others about the same period in which we made the attempt.

The quantity of cotton made in Maryland and Virginia is so small, comparatively, that it will scarcely affect the estimate. The drought probably lessened it somewhat.

In North Carolina the same evil, as we have seen in treating of other crops, was most severely felt, and the estimates made vary from "50 to 75 per cent." less than the last year's crop. This is probably too high an average; but we believe it must have fallen short at least "about one-third."

In South Carolina, in June, we are told that "the cotton crop, in some sections, will be very good. That which was planted early is promising, while the late crop will be indifferent." Again, in the same month: "*Forward cotton.*—A subscriber of ours in Edgefield district (says the Hamburg, S. C., Journal) informed us, on Wednesday, that he had plenty of cotton squares on his field, and that within ten days or less he would send us some blooms." Again, in July: "*Early cotton.*—The Edgefield (S. C.) Advertiser, of the 19th instant, says: Colonel F. W. Pickens has left at our office some cotton bolls which were full grown on the 4th instant. They were pulled from one of his fields at Edgewood, near this place. We understand that cotton is beginning to open at the same plantation." In Pendleton, it is said "cotton is flourishing; and though the plant is not so tall as usual, the number of bolls is greater."

Discouraging accounts, however, are given of the Sea-island crop in the same month. "In South Carolina the excessive heat has destroyed every thing but cotton, which stands drought better than anything else. This crop on the Sea islands is, according to the Courier, in a peculiar situation. The early planting in March came up and grew kindly, and still promise well. The early plantings, in April, are half up, and the fields show an irregular stand of plants from 6 inches to $2\frac{1}{2}$ feet high. The latter plantings did not come up till the 20th of May, and are of course unusually backward, and exposed to the vicissitudes of storms, caterpillar, and early frost. It is possible, but is by no means probable, that the plant may escape all these

liabilities, and it is therefore safe to calculate the Sea island crop of 1845 at a product decidedly short of last year."

In August, too, the notices of the crop in this State are of the same diverse character, thus: "The Columbia South Carolinian, of the 14th, says that six bales of new cotton were received at that place on the 8th instant, from the Cane-brake plantation of Richard Lowdley, esq., in Newberry district, and put in store in expectation of a short crop."

Again, under date of August 1st, the Charleston Patriot says: "*The season and the crops.*—We learn by private intelligence from the interior, that the drought continues distressingly severe. In Richland, Lexington, Orangeburg, Barnwell, and other middle districts of the State, the most sanguine expectations do not look to make half a crop. Even on some of the best river swamp lands, along the Edisto, where a thousand weight of seed cotton might be made to the acre in seasons ordinarily favorable, we are told that 100 would be a fair calculation."

The accounts we have received from other sources, of a later date, are of a similar discouraging character. Thus, in the northwestern part of the State, the crop is supposed to have been "25 per cent. less" than that of the previous year. East of this, and bordering on North Carolina, the drought was felt yet more severely; and the failure was very great, and is even estimated as high as "one-half or three-fourths" of the whole crop. In the western central section, bordering on Georgia, it was probably "about one-third less;" and in the central portion of the State, "about 30 per cent. less;" while, of the section still further to the east, central, on the coast, &c., it is stated that the crop was "about the same." The drought was indeed great, but the cotton crop is said not to have been so much affected, and the favorable fall (frost coming very late) matured the late crop; so that, upon the whole, it is considered that "the present crop will not fall much short of that of the previous year." Taking into consideration the fact of the drought, and the emigration which is yearly going forward from this State, of cotton planters, still further west; that the cotton lands are running out, and scarcely any new lands to be brought under cultivation for this purpose, we believe that the cotton was considerably lessened the past season, and therefore fix the decrease, according to the best judgment we can form respecting it, at about 20 per cent. as compared with the crop of the preceding year.

To a more limited extent, the same remarks we have just made as to the causes of the decline of the cotton crop of South Carolina will apply to that of Georgia. We subjoin such notices as we have selected, to give a view of the progress of the crop in this State. In June, "accounts from Georgia represent the prospects of the cotton crop to be good. The plants had begun to blossom." The Albany (Geo.) Patriot says that "the crops, generally, in that vicinity, notwithstanding the drought, promise an average yield."

"The rain with which we were favored on Wednesday last, and which was much needed in this section of country, we are glad to hear extended as far south as Darien. The crops throughout Camden, Glynn, McIntosh, Liberty, and Bryan counties, had suffered much for want of it; and several planters, we hear, had replanted a portion of their cotton crop, while a number had planted in the dry gound, and were patiently awaiting a rain to sprout the seed."—*Savannah Georgian.*

Again: "The drought, which has been general throughout the south,

has in Georgia been severe. Crops are injured in Alabama, Georgia, and the Carolinas, to an extent heretofore unknown. Cotton will be cut short at least one-third."

So, in July: "*Milledgeville, Georgia, July* 1.—*The weather.*—In this section of Georgia we are passing through a severe drought, and the weather is, as usual under like circumstances, excessively hot. Cotton, of which our planters have put in their usual crop, seems to sustain itself wonderfully. The complaint of drought is extensive; but we notice with pleasure that our northwestern counties, and the adjoining portion of Tennessee, have abundant rains."

Again: "From the various sections of the State we regret to learn, through the delegates to the convention, that the drought has been unparalleled; in some parts there has not been rain in two or three months, and all kinds of vegetation has been burnt up; while, in other places, although the drought is not so severe, scarcely one-half or one-fourth of a crop will be made. Thus far, cotton has been less affected than any thing else; indeed, it has not been injured a great deal; but, unless the season changes soon, that, too, will suffer."—*Milledgeville (Ga.) Journal.*

In the Savannah Republican: "The cotton in the interior has not suffered so much; yet it is not at all probable that there will be more than two-thirds of a crop made, unless the fall should be an unusually late one. Extract of a letter to the editors, dated Jacksonville, Telfair county, 5th July.—'Our crops are injured so much in this county that we shall not make more than half a crop on the average; yet we are better off than the surrounding counties.'"

The Macon Messenger, of July 15, says: "Our superior court is now in session, and we have had opportunities of conversing with many of our country friends. They represent their stands of cotton in general to be very good. In Upson and Houston, they are said to be unusually promising. In Talbot and thereabouts, not so good. In Lee, very good. We have heard of some instances where the stand was poor; but in these cases the cause rests with the planter: the fault was in his planting too late, and in not giving proper attention to his ground."

The Savannah Republican, of the 11th, states: "Yesterday we had the heaviest fall of rain since the 1st of January. The cotton crop in the interior has not suffered so much; yet it is not at all probable that there will be more than two-thirds of a crop made, unless the fall should be an unusually late one."

In August, likewise, a public journal makes the following remarks: "There is strong talk of a very short crop. The season has been unusually hot throughout the country, and over extensive sections very dry. At the south the drought has continued for months, so that cotton put on board boats in the spring has not yet reached the coast. We give below several statements and extracts from letters, which we have no reason to suppose were made for effect, and they come from persons likely to be very well informed."

EXTRACTS OF LETTERS.

"*Macon, August* 16.—There is no question now but the crop must be short. No sort of weather can bring the plant and bolls to maturity. In Georgia, I have now no idea that over five eighths of an average crop will be made. In many counties it will not be over one-half to one-third. If our receipts here are 75,000 bales, it will be as much as we may expect.

Mr. ———, on his way to Gainesville, saw three of his acquaintances from Mississippi. They said that till within three weeks before they left home the season had been favorable and the prospects good, but since that, in consequence of the drought, the crop would be cut short one-third. In some parts of Alabama, the crop has suffered. Mr. ———, from Twiggs, says he shall not make over five-eighths of a crop, and his cotton was more promising than that of most of his neighbors. Mr. ——— was here yesterday, and offered to take 20 bales for his crop. He made 90 bales last year from the sown ground. Some planters from Jasper county say that they shall not make 100 lbs. to the acre."

"*Macon, August* 20, 1845.—There cannot be more than 75,000 bales received in Macon. Last year 136,000 bales were received at Macon."

A writer also from Griffin, Jefferson county, says: "Cotton is small and stunted, and although it can do with less rain than corn, will fall considerably short of an average crop throughout the State. In the upper counties the seasons have been more favorable, and the crops are good."

Again: "*Savannah, August* 23.—Our cotton market, if it can be said we have one, remains without change, and during the past week we have not heard of a solitary bale changing hands. The accounts from the interior are more and more gloomy every day of the growing crop; and unless we are greatly favored, the crop in this State will be materially cut off."

Again: "We have cherished the hope for some time past," says the Macon (Geo.) Messenger of the 21st inst., "that a change of the season might materially benefit the prospects of the cotton crop. But the drought has now so long prevailed that very little benefit could be derived from a change of the season. It is only in very limited sections of the State that the crop can be a middling or an average one; in other parts it must be a very short one."

A correspondent of the Columbia Enquirer, a planter, who states that he has lately travelled 300 miles in the heart of the State, says: "The cotton crop is in a precarious state, and there is not the slightest prospect of an average crop in this State. A few days more will seal its fate. The failure of the cotton crop will greatly aggravate the suffering of the people of Georgia."

A public journal estimates the Georgia crop at three eighths of the average yield, and in some counties of the State one-eighth to one-half. "Some planters in Jasper county say they will not make 100 lbs. to the acre. At Macon, it is estimated that not over 75,000 bales will be received this year against 136,000 in 1844–'45."

The subsequent accounts are more favorable. Thus in October, the Milledgeville (Geo.) Recorder says: "Our unusually mild fall has changed in a slight measure the prospect through this portion of the State, in reference to the yield of the cotton crop. From all we can now learn, from all sources, as well as from personal observation—which, by the bye, has not been limited—we have come to the conclusion that, from the late growth having more fully matured than was at one time anticipated, there will be realized about two-thirds of a crop. The article in general, however, will not be found as good staple, or be altogether as fair in quality, as usual. This arises from the bolls having been prematurely forced open by the drought before they had obtained their growth, and subsequent rains having frequently stained the late picking."

Again: "*Florence, on the Chattahooche, Ga., October* 18, 1845.—Since

my last the prospect is better for the cotton crop in this section, and I am now of opinion we shall gather nearly a full crop in this county, as the several growths on the uplands have nearly all matured, and considerable of it opening at this time. We have not yet had a killing frost, and the weather is now fine for the growth of cotton. Our first picking here was not so good in quality, but the second is pretty cotton, and I think the quality will be as good as the average of the season."

"*Fine cotton.*—The Augusta Chronicle and Sentinel of the 31st ultimo says: 'A sale of 100 bales of cotton, a part of the crop of W. J. Eve, of this county, was sold on Wednesday, at eight cents per pound, and yesterday a lot of 48 bales of the crop of F. Merriwether, of Oglethorpe county, brought seven and three-fourths cents. They were both very choice lots, in square packages.'"

From other sources, it is stated that, in the central section, lying west of the Ocmulgee river, there has been about "three eighths of an average crop." Higher up it was better. In the northwestern corner of the State it is estimated that the crop was cut short at least "one-half." We believe that the average decrease of 20 to 25 per cent. will be a fairer estimate.

The prospect of the cotton crop in Alabama, in June, was decidedly good. It was considered fully a fortnight later, indeed, than the previous season. Somewhat nearer the close of the month the account from Mobile is stated to be, that insects and the disease known in the country as "sore-skin," rendered the appearance less promising in some of the counties. From other sections of the interior, however, the accounts are still favorable, and although the season has generally been admitted as two weeks later than last, it will be remarked that the first cotton blooms appeared a day or two earlier this season in our own State, and about a week sooner in Mississippi. On the 24th ult. full-blown blooms were seen in Warren county, in this State, and bolls as large as musket balls on the 1st inst. The early bloom of cotton is regarded by many as indicating a long season, or a late frost, and consequently a large crop. The numerous casualties, however, to which this plant is exposed, and the long period yet to elapse before the crop can be considered made, should admonish us of the futility of speculating on the subject for months to come."

In July, we learn—"The cotton is suffering from lice in consequence of the unseasonable weather. A fine rain and warmer mornings would brighten the prospects of the coming crop considerably."

Again, the Mobile Journal says: "We still hear complaints of injury to the cotton crop from continued drought; but probably, ere this, those sections of the country have been visited with a sufficiency of rain to revivify the drooping plant. Correspondents from the interior begin to be apprehensive of a greater injury from the excess of rain from this time till the close of the season. In Marion county, Alabama, the cotton crop had commenced falling, but could wait longer for rain without much injury. The growth is not so large as last year at this time, and, unless we have too much rain in August, will yield an average crop. The River State Review, of the same place, of the 9th instant, says: We have had but very little rain, but the cotton crop is not injured, but very promising."

So, in August. Extract of a letter dated Montgomery, Alabama, August 14: "Our corn and cotton crops will be very short in this section this season, in consequence of the long drought we have had. New cotton begins to come in freely. Prices range from 6 to 7 cents."—*Nat. Intelligencer.*

Again, in the New York Farmer: "*Alabama.*—The cotton crop will

probably be good, as there have been no complaints of an excess of wet to injure it. We expect a fair crop."

In a letter from Montgomery, of August 20, a writer says: "From the best information that we can gain of the incoming crop of this part of the State, and indeed of the State at large, it must be a very short one. The frosts in the spring, the 'lice' a little later, and the lack of any thing like a season since March or April, together with the appearance of the plantations, so far as they have fallen under our observation, all convince us that the present crop will fall far below any preceding one for the last five, or even ten years."

Again: "*Cotton crop of East Alabama.*—The crop in Barbour, Russell, Tallapoosa, Chambers, and Randolph is pronounced a failure. The Wetumpka Whig of the 28th says: In Barbour the crop is very short, but we have heard no estimate of the probable deficiency. Russell, Tallapoosa, and Randolph, lack a full third of an average crop, and Chambers nearly one-half. Benton, we are informed, will make nearly an average crop. They suffered very little there from drought. In Chambers we conversed with a number of farmers, not one of whom had made a half crop. One has got four and another six bales from 50 acres of land each, such as usually produces from 600 to 800 lbs. to the acre. Another planter assured us that on no part of 300 acres in cotton would he gather more than 250 lbs."

The Mobile Reporter, of August 26, also represents the crop as falling short of the average.

Subsequent information is of the same general cast. In the southeastern section of the State, it is judged to have fallen off "one-fourth." In the central section, "one-third." "The drought injured it. It appeared to revive in the early part of the fall. The frost, however, nearly destroyed the newly formed bolls." In the western part of the State it was about "20 per cent. less." Taking the whole State, the decrease was probably from 15 to 20 per cent.

Mississippi furnishes a large amount of cotton. The lands having been more recently devoted to this purpose than those of the cotton-growing Atlantic States, they are still in their vigor, and will probably be so for a number of years to come. Some complaint is made of the crop suffering from the lice; but on the whole it is believed to have been a fair crop, and in some portions an increased one.

The accounts we have gathered respecting its progress have the usual diversity. In June, the Clarion, of Paulding, speaking of this crop, mentions the ravages of the lice, by which the cotton in that vicinity had suffered. The following notices are in the same month. The Jackson Southern Reformer (Mississippi) says: "We are sorry to learn from various portions of our State that the cotton crop has been greatly injured by lice. In several parts of Yazoo and Madison, planters have lost three-fourths of their present stand. We also learn that in counties to the east similar damage has been sustained. Such has been the case in Lauderdale, Kemper, Neshoba, Noxubee, and several other counties."

"The Yazoo (Mississippi) Banner, of the 21st, states that the crops in that county are unusually promising. The Macon (Noxubee county) Independent, of the 19th, says the cotton crop was never more promising; and notwithstanding the usual proportion was not planted, yet we anticipate an abundant crop."

In July. The Carrollton Democrat, of the 23d ultimo, says: "From diligent inquiries, we learn that the cotton in this section of country is unu-

sually promising; and if the picking season is favorable, a larger crop will be gathered than for several years past."

A statement early in July from M. W. Phillips, contained in the Southwestern Farmer, gives the following view of this crop at an earlier date: "The cotton crop is, generally, 10 to 14 days more backward than last year. Of this crop we will give more than this passing notice, it being one of importance to the world. The stands of cotton, when first rising, were the best we ever saw; and we have heard the same expression everywhere we have been. At present, this is not so. Much injury has been sustained by the cut-worm and the cotton louse; some planters have been compelled to replant very largely since the 25th of May. We saw some cotton that had just risen on the 7th of June. In some regions on particular plantations, and in spots, the stand has been totally destroyed, whether planted on cotton, or corn, or stubble land—on ridge, level, or in hollows. It seems as if these pests would destroy on different descriptions of land on different places. We are not sure but that these pests may benefit some by thinning; but when they have destroyed, as on James Brown's plantation, for instance, the crop must inevitably be shortened; though a favorable fall effects wonders in a cotton crop. Although the first bloom on some farms would only indicate eight to ten days' backwardness, yet the general crop wherever we have examined, except four or five plantations, shows clearly at least two weeks. To explain: The first bloom we saw was on the 7th, at Mr. Low's plantation, between Livingston and Canton—off the road. The first that was seen there last year was on the 28th of May—only ten days difference. But last year, by the 7th the crop would have averaged five to ten forms; this year, not a stalk in ten has a form. Again, on many farms there are stalks that will measure two feet, and far more that will measure under six inches; irregular in height; much now dying from the effects of the louse; cut-worms are even now cutting off the cotton, even six or eight inches above the ground. A few have increased their cotton crop; some have decreased. A few have gone to the coast to raise sugar, and probably a few have quit cotton; we know of one, and heard of another. Taking all this together, we place the crop as last year, as to quantity cultivated. If we sum up the whole *pros* and *cons*, taking into consideration the unfavorable season, with the backwardness of cleaning the crops, we do not think the cotton crop will be as good generally on the 20th of June as it was last year from the first to the fifth. No human being can prognosticate thus early; but we may each one count on not making what we did last year."

The Planters' Banner of the 20th September likewise furnishes information from the same writer, still later: "Dr. M. W. Phillips, of Hinds county, Mississippi, writes us as follows, under date of the 7th instant: 'I have made inquiry as to the present crop. But few planters can be induced to give an opinion. One planter, who has made short crops for several years—letting his negroes manage themselves—told me last night that he and four other neighbors, together, would not make what he made last year—125 bales. They ought to make four times as much. Those who will express an opinion, think that the crop of this county and Madison will not exceed half a crop. Last year I had 93 acres in, and sold 81 bales; this year I have 105 in, and will thank any one prodigiously to insure me 70 bales. I will be 20 bales short of the average yield. This shows enough deficit; which, if general, and no greater loss, will be equivalent to a re-

duction of 300,000 bales. This subtracted from last year's crop, adding the supposed loss by overflow, will make the present crop less than 2,300,000 bales. Will it exceed 2,000,000 ?' "

The following is of a later date; it appears in the Savannah Republican of October 31: "We are indebted to friends in this city for the following extracts of letters in relation to the crop. Up to this time there has not been a killing frost in this State, and the weather is now unusually warm and very favorable for maturing the plant.

'*Holly Springs, Miss., October* 18, 1845.—Since the early part of September the weather has continued dry and very favorable for picking as well as maturing the young bolls of cotton; and the planters having made good use of the time, have already picked out a great deal more than they expected to make a few weeks ago. From all the information I have—and my business and situation enable me to hear from every part of northern Mississippi—we shall make the largest crop of cotton that has ever been made in this State. In several of the river counties the planters are making 2,000 and 2,500 pounds to the acre; and I think the average product in most of the counties in this region will be 1,000 pounds to the acre. A bale to the acre is very common on the valley lands. The quality is also very fine, having been picked without any rain.' "

The information obtained still later is of considerable diversity. In parts of the State there has been an increase; in others, a falling off. In the southwestern portion, for example, lying west of the Pearl river and south of the Yazoo river, the increase is thought to have been "5 to 10 per cent." There was an increased cultivation in the northern portion of the State, though the amount per acre may not have exceeded if it equalled the crop of 1844. On the whole, it is believed that the crop for the State was larger than in the previous year by 15 to 20 per cent. above the estimate for that year, which it would appear was too low.

The cotton crop of Louisiana was, we think, better than that of the previous year. The drought affected it considerably, early in the season, and some complaints are made of insects. But the long period of dry weather enabled the planters to get out the grass from among the cotton, so that the evil was in a measure counterbalanced.

In July, the Natchitoches Chronicle of the 5th says: "From all parts we hear favorable accounts of the crops. The rust, which made its appearance in some cotton fields a few weeks since, has done little injury and disappeared."

Other notices in August read in this manner: "The crops in the parishes of East and West Baton Rouge, says the Gazette of the 9th instant, have not generally, for several years, presented as promising an appearance as they do at present. The planters of Point Coupée are busily engaged in picking their cotton. The staple is represented to be generally of a fine texture."—*New Orleans Picayune.*

"The cotton crop has suffered very much; and now that the picking has commenced, planters are beginning to see better the damage that has been done by the falling off of the forms, and otherwise. A friend, who has been travelling over this and a number of the neighboring parishes, informs us that the hopes entertained by the planters a fortnight ago it is now certain will not be realized."—*Concordia Intelligencer.*

Subsequently, in September, &c., complaint is made in some parts of frost and rains. The Saint Landry (La.) Whig, of the 8th instant, says: "For

two weeks past we have had rain every day; sometimes in perfect floods; at others, in but gentle showers. The consequence is, cotton is suffering very considerably. We thought it advisable to say nothing of these rains last week, hoping they would abate, and enable us to assure our friends that the damage was but small; yet it is otherwise. Our prospect in the beginning of the season was most propitious; but if we say now that at least one-fourth of the crop will be lost, from the rain and rust, we certainly are below the actual mark. These are lamentable truths, which it gives us pain to chronicle."

Again: "The frosts that occurred during the early part of last week have been sufficient to check effectually the growth of cotton on the low lands. The calculation is, then, certain, that bolls of the blossoms of the 15th September cannot make, or rather mature."—*Concordia* (*La.*) *Intel.*

"The Clinton brought down 1,420 bales of cotton. The Monarch brought 1,808 bales. The Sultana 2,764 bales, the largest load yet. Making 6,092 bales on three boats, arriving within an hour or two of one another."—*New Orleans Tropic, October* 27.

Again: "The cotton planters have had most favorable weather for picking, and we hear no more of a short crop. It will not, however, be much; possibly no larger than that of last season. Prices range from 6½ to 8½ cents."

The information since obtained speaks of an increase of 10 per cent. more, in consequence of the overflow which was caused by the crevasse of the last year, (1844.) There was more cultivated, and the general crops of the alluvial lands were rather heavier, in consequence of the dry weather, and the decrease of the cotton crop in the upland by reason of the drought. On the whole, it is believed it will average 10 per cent. more.

The same was probably the case in Arkansas, if the ratio was not even larger, on account of more land being brought under cultivation. It is believed, however, that any increase in this way may have been balanced by the emigration further west.

Florida, since it has been open to cultivation by the resettlement of the country on account of peace, has gained in her crops of all kinds; and her cotton has increased probably 20 to 25 per cent., as it lies so much further south.

In July, it is said, in one of the public journals: "We hear that a good crop of cotton is expected. The Floridian of the 5th instant says: 'We were presented yesterday with an open boll of new cotton picked on the 1st. The staple is fine and beautiful, and would rival the snow in whiteness. We believe this to be the first boll of cotton that has been picked in this county this season.'"

Again: "The cultivation of this valuable staple seems destined no longer to be confined to the limited section of country that has hitherto produced it. Several attempts have been made to extend its cultivation in other places; and many of these attempts have proved quite successful. The Tallahassee Floridian states that five or six samples of cotton, raised in Middle Florida, were lately exhibited in that place; and after being examined by competent judges, were pronounced to be worth from 22 to 30 cents per pound. The best specimen was raised on light, sandy soil, which would produce about 325 pounds to the acre. Two of the samples, grown on pine land, would yield about the same quantity. Another sample, grown on red clay soil, was equally good; and, altogether, the experiments were quite encouraging."

The Tennessee crop was better than an average. As early as June it is stated that an average crop may be expected. The Nashville Union, also, yet later, states, that in that section of the country the stand of cotton is finer than they ever saw it before; though fears had been entertained by some that the late frosts had injured the cotton crop.

The Texas crop is much larger than it ever was before, and is believed, on the whole, to have been 50,000,000 pounds.

On a review of the whole cotton-growing region, it is believed, therefore, that although the crop has fallen off in the Atlantic States, on account of the drought and the emigration to the richer cotton lands in the States further west, yet the increase in the southwestern States and Texas has more than made up for it. We have based our calculations on the fact that the estimate for 1844 was not large enough, and calculated the increase or decrease accordingly. This should be borne in mind in comparing the estimates of the two years. In the Baltimore Sun of October 14 we find the following statement, which relates to the whole crop. It will be seen that the estimate does not vary essentially from the one we have made:

General Jesse Speight, of Mississippi, a cotton planter of much experience, gives it as his opinion, in a communication to the Columbus Democrat, that the present cotton crop will not much exceed 2,000,000 bales. He writes the communication from having seen, in the Albany Argus, a statement to the effect that the crop would prove to be a heavy one; amounting to 2,500,000 bales."

We add, also, a few notices of some remarkable varieties of cotton, &c., which we have taken from the public journals.

" Mr. R. P. Burton, of Camden county, has sent us a cotton stalk grown upon his plantation, which, in its line, beats anything we have ever known in these parts. It is of the fine *big cream* kind, and is nearly 12 feet high, and about *ten* feet [probably meant for two] in circumference at the foot of the stem. We learn, from the letter accompanying it, that the number of bolls and forms contained upon two limbs, each six feet from the ground, amounted to seventy-eight. The whole stock contains several hundreds—too numerous to count. But what is most remarkable, it grew upon land which had been *planted in succession eleven years*. It would be a curiosity at any time; but, for so dry a season as the past has been, it quite takes the rag from every other bush. We intend to have a cane made from the upper portion of the stalk, if we can find enough of sufficiently moderate dimensions for the purpose."—*Savannah Republican.*

The Cassville (Geo.) Pioneer says: " Mr. Hugh F. Longing, living in Henry county, on the Towaliga, eight miles from Griffin, brought to our office last week a stalk of cotton, which he calls the New Orleans and money-bush cotton, which he stated grew on second quality uplands, now 20 years in cultivation without manure. The bush was literally covered with pods. He said he should gather from the field planted at the rate of 1,500 pounds to the acre; while a patch of the common kind along side of it, on the same soil, with the same attendance, would not produce more than 1,600 pounds to the acre. His brother last year planted, in Harris county, fourteen acres of the same kind of cotton, on second quality gray post-oak land, and gathered from 2,000 to 2,500 pounds per acre."

Dr. Cloud, of Alabama, says, in a letter in the Cultivator of March, 1845, respecting a sample of a variety of East India cotton: " The stalk from

which this sample of cotton was taken attained the height of 13½ feet; had on it at frost 60 bearing limbs, and measured 16 inches in circumference between the first two limbs from the ground, and contained at one time, about the 1st of September, upwards of 1,200 bolls, blooms, and squares. My opinion is, that this variety promises to make a great produce in our climate. When other cotton was selling at 4½ cents per pound, I was offered 15 cents per pound for a sample of this. It is the true green seed—the natural tendency of our climate and soil—and therefore the kind upon which our improvements should be made."

The following paragraph is interesting:

"*Analysis of seed cotton—as a farmer, not as a chemist.*—I have, as is my usual custom, weighed and ginned out a lot of cotton, and give the result of the analysis. The loss of 13 pounds I am unable to account for, knowing that accuracy and care were observed, for I weighed every parcel and ginned it myself; for, where popular accuracy is required, I do all the work I can. Weight of seed cotton, 404½ pounds; weight of cotton seed, 274½; cotton, 113; motes, 3; loss, 13; total, 404½. The seed measured, heaping measure, 11 bushels. The seed weighed, per bushel, 25 pounds. It thus requires 1,410 pounds of dry cotton to make a bale of 400 pounds, exclusive of baling and rope; which contains 35 bushels of seed, and yields the small average of 28 pounds per cwt."—*Southwestern Farmer.*

In the appendix No. 11 will be found several interesting articles, &c., relating to the culture of cotton. One of these is from the Southwestern Farmer, and contains Governor Hammond's report on the culture of cotton, with the comments of the editor of the journal—supposed to be M. W. Phillips. Mr. McDonald's mode of preparing cotton for the market will also be read with interest by cotton planters in the south. In another of the articles is a letter from the "*Union*," containing an account of the failure of the cotton experiment in the East Indies by the British government. On the other hand, we have also given some statements of the views indulged on the other side of the Atlantic respecting the same object. We pretend not to reconcile the apparent contradictions, but give them only as a part of the history of this effort, on the part of the British nation, to render themselves independent of our supply—a fact which does not seem to be near at hand.

An article in the Foreign Quarterly Review of July, 1845, deserves also some notice, on account of the development of plans suggested to aid this movement. The subject discussed is "Railways in India." The writer says: "Among these, if we commence operations with the Deccan, the most important by far will be cotton, of which a sufficient quantity may speedily be raised in India to render us completely independent of the slave States of America. And here we may briefly allude to a fact, which will not be regarded with indifference by the friends of humanity: A company has just been established in London expressly for the purpose of promoting the cultivation of cotton in India; primarily with a view of combatting slavery, by depriving it of the aliment on which it feeds. But, in whatever motive such an association may have originated, its results cannot fail to prove beneficial to commerce. Recently, great efforts have been made to improve the quality of cotton in the collectorate of Poonah. In one district an extremely fine sort, equal to the best Baroche, has been introduced, and fetches a very high price at Bombay. In other parts arrangements are making for cultivating the New Orleans cotton, which the

most experienced agriculturists in western India expect will thrive admirably. It will be comparatively of little avail, however, to expend money on the great cotton grounds of India, unless, at the same time, we provide the means of conveying the produce of those grounds on the coast. This consideration chiefly, perhaps, has suggested to Mr. J. Chapman, a man of remarkable abilities and extensively acquainted with the country, the propriety of running the first line of railway across the Deccan, from Bombay on one side to Coriuga on the other. The line would commence at Bombay—run along a causeway to the island of Salsette—reach the main land by means of a bridge thrown over what is called the Tannah river; and then, traversing the Cocan, ascend the slope of the Ghauts—pass by Poonah, a city of 130,000 inhabitants, and, diverging towards the north, cross the district of Ahmednugger; sending out branches to Shulapore on the one hand, and Patoda on the other. From Ahmednugger, following the great valley of the Godavery, it would project itself eastward, till, through the Bheer cicars, it entered the Nizam's dominions. Proceeding across Nundeer, and sending forth an important branch northward to Oomrawutty and Nagpore, which might ultimately be carried over the Nerbudda to Allahabad, it would intersect the cicar of Eilgundel; whence it is proposed that a branch should be carried southward to Hyderabad, the Nizam's capital—a city larger than Paris, and containing 800,000 inhabitants. It is intended that this branch line shall afterwards be carried across the Kisna to Madras, from which port it is calculated that 134,000 tons of merchandise are now annually shipped. From Eilgundel the trunk line would stretch through Tullangoar, Warangal, Kummumet, and Rajahmundry, to Coriuga, probably crossing the Godavery where its channel is intersected by numerous islands. Thence the railroad would be carried through the northern cicars and the province of Orissa, to Calcutta. Among the advantages of this line, there are some few which appear to be deserving of especial notice. Upon the first and greatest we have already touched—we mean, that it would intersect the cotton districts; but there are several others which ought not to be overlooked." The writer elsewhere goes into the cost of transporting cotton to the coast. The cost of transport from Bellary to Kamptee, in Camara, 184 miles, has been reduced, by having a cart road, from 7¾d. per ton per mile to 3½d. The writer goes on to say: "This cotton, ill-cleaned and subject to much damage from thorns and bushes on the road side, and dust during its passage, on the backs of oxen, below the Ghants, sells at Kamptee for little more than twopence per pound. Thence it is shipped for Bombay, where it is screwed into bales for the English market. It has been found, upon calculation, that the cost of bringing this cotton from Bellary to Kamptee, a distance of 184 miles, considerably exceeds that of conveying it to England, a distance of 17,000 miles. Taking the price of carriage in India at 2½ annas per ton per mile, and reckoning the value of money according to the price of bread-corn—at six times what it is in England—it is equal to 22½ pence there; whereas the expense in England is 10 pence per ton on common roads, and about 3 pence per ton on canals in general, or even as low as one penny. If 3 pence be the average, it is less than one seventh of the cost in India. The expense of the transport of goods from Madras to Trichinopoly, 230 miles, is 25 rupees, or £3 10s. per ton, which is nearly as much as the freight from Madras to London. The most important fact, however, still remains to be considered. When brought into the market at Liverpool, this cotton often

sells with difficulty at 3 pence per pound, so that the merchant importing it profits but very little by the transaction."

Several interesting tables, as well as extracts from the Liverpool Times, giving a full view of the cotton trade of Great Britain for the past year, will be found included in appendix No. 11.

By this, it appears that while the product of the United States imported into Great Britain has increased from 1,157,924 to 1,376,894 bales, that of the East Indies has fallen off from 142,796 bales to 79,640 bales; and that of Demarara and West Indies, &c., from 14,674 to 6,314 bales, and Brazil and Portugal from 112,369 to 110,176 bales. The Mediterranean only, besides the United States, has increased, viz: from 63,221 to 79,707 bales. The whole increase of import is stated at over 174,000 bales.

The prospect seems to be that an increased market for cotton may be opened in Russia and Austria, and perhaps some others of the European kingdoms. Such is a view of an intelligent traveller in the latter empire; and as to the former, see the following extract, found in one of our public journals:

Extract from a letter from A. P. Gibson, esq., United States consul at St. Petersburg, dated August 30, 1845: "The quantity of cotton imported this year direct from the United States is 6,992,818 pounds, whereas the highest import heretofore was 3,150,680 pounds in 1843. If this government should not change their present policy in respect to their encouragement of manufacturing establishments, Russia will become a great consumer of raw cotton, for the number of spinning establishments is constantly on the increase; and it is estimated, by competent judges, that by the end of this year there will be in operation in the whole empire from 800,000 to 1,000,000 of spindles."

The progress of cotton to its manufacture, and its increased value, is curious. A statement is given in the public journals, which thus traces it when sent to Europe:

"*Progress of a pound of American cotton.*—The following is the history of the travels and adventures of a pound of manufactured American cotton: The cotton came from the United States to London; thence to Manchester, where it was spun into yarn. It was then sent to Paisley, where it was woven; next to Ayershire, to be tamboured; afterwards it was conveyed to Dumbarton, where it was hand-sewed. It was then again sent to Paisley, when it was conveyed to a distant part of Renfrew to be bleached, and then returned to Paisley. It was afterwards sent to Glasgow and finished; and from Glasgow it was conveyed, per coach, to London. From its shipment in America till its arrival in the London warehouse, it must have been conveyed 3,000 miles by sea, and 920 on land. The value was increased 2,000 per cent. by the processes of the manufacturer, whilst no less than 150 people were engaged in its carriage and preparation."

The subject of cotton mattresses was mentioned in the report for 1844. Since then, we have found it stated that they are extensively used, and preferred to all others, except hair mattresses, on board of many of the steamboats at the west. A further testimony in their favor, we learn, is also given in the Boston Medical and Surgical Journal, an account of which is thus given in one of the public journals. "The Boston Medical and Surgical Journal, in an article from Dr. Smith, says that a great business is doing there in cotton mattresses. There is in the city of Lowell an extensive manufacture of these beds of an elegant appearance. They have the ex-

ternal finish of hair mattresses; but, besides being equal to any material in use for stuffing a tick, they have an important advantage over all other kinds of beds known to the community in their cheapness. They do not, it is said, seem to differ essentially in point of reaction, after being laid upon, from hair. For economy, they put even shaved ratan at defiance. In winter, it is a non-conductor of caloric. On board of ships and steamers, besides fulfilling the first intention of furnishing a first-rate sleeping apparatus, each one would become a life-buoy in case of emergency, capable of bearing up a man. In hospitals, especially, in which bedding is always a great annual outlay—arising from the fact that a great many beds are necessarily destroyed in consequence of imbibing offensive discharges, &c.—these cotton beds will speedily, we apprehend, become an important consideration. Feathers have been rapidly passing out of fashion for years; yet hair is too dear for universal use, a large part of it being imported. Cotton is a product of our own country, to be had in any abundance. The only question in our mind is as to the healthiness of the article; but, as we have the recommendation of a good physician and an able medical journal, we suppose the objection is rather one to be put down to prejudice than to fact."

RICE.

The rice crop is nearly all raised in the two States of South Carolina and Georgia. The last year's crop, (1844,) it will be recollected, was considered to have been unusually fine. The intelligence respecting this crop the past season leads us to conclude that it was not as large as the usual average one. We give a number of statements from notices in July, on which this conclusion seems to be authorized.

" *Georgetown, S. C., July* 12.—We have had four refreshing rains during the week, which will do much service to the upland crops. But the rivers continue salt, and the rice planters who planted the 1st of April are much annoyed with worms and flies, being unable to take on water, and find it unsafe to change that which was taken on when fresh. Some crops up the rivers look very well, and promise an early harvest. On Wednesday, Mr. Bates sent us three stalks of rice from Mr. Richard O. Anderson's Ramsey Grove plantation, full five feet high, one of which had put out a fair ear, and the heads of the others were visible.

" The annexed letter is from an experienced planter in the neighborhood, and the information it contains may be relied on as to the Black river and Pee Dee, and indeed the whole rice district:

' Black River, *July* 10, 1845.

' Dear Sir: A friend of mine, who resides on the Pee Dee river, six miles by water from Georgetown, brought me a pint bottle of water taken from the Pee Dee river, at high water, on Sunday. On Tuesday I had the same bottle filled at high water, in the vicinity of Pringle's ferry. The contents of both were boiled separately, and produced one teaspoonful each of salt. The water from Black river produced rather more than the Pee Dee water. The water is sweet here at high water, and I look for salt the first easterly wind. Should this drought continue for one week longer, I have no doubt the salt will go very high up this river. The crops of rice, consequently, must be short. I estimate the loss at one-fourth at least, and particularly low on the rivers. The old rice is in barrel; (I have one field

ready to put out;) the second planting in joint, and the young rice wanting showers. The rice crop has also to contend with maggots, where the water cannot be used; and the dry rice has weevil and Hessian fly, both of which are very destructive. Amongst all these difficulties, I think my estimate of one-fourth as an average loss is within bounds.'"

Again: "The harvesting of the rice crop in this State was pretty generally commenced in the early part of last week; but, owing to the frequent showers, there has not been much progress made in securing it. We yesterday conversed with a gentleman, who, from his position, is perhaps better informed as to the rice crop in this State than any one else in the city; and he gives it as his opinion that on the Savannah there will be but little less raised than last year, notwithstanding the crops of several planters have been almost entirely destroyed by the salt water. On the Ogeechee there will be an increase over last year, provided the remainder of the season should prove favorable for harvesting. On the Altamaha the crop will be much less, and on the Satilla there will be a great falling off. On the inland plantations the crop will be light, owing to the extreme and long continued drought. On the whole, the crop in this State will be considerably short of that of last year, and prices will therefore rule correspondingly high. We are inclined to think, from all we have heard and read, that the crop of South Carolina will show a greater falling off than that of our own State. We may reasonably conclude, therefore, that the Savannah market, owing to the abundance of the production on this and the Ogeechee rivers, (most of which finds its way here,) will be found equal to that of any other."—*Savannah Republican.*

Again: The Georgetown South Carolina Observer of the 30th ultimo says: "The rice harvest has commenced in some parts of the district, and will be general in the course of the ensuing week. All our fears as to a short crop will be fully realized; and we put it down now as certain that the crop of this neighborhood will be short at least 10,000 tierces. This has been the most inauspicious year for the rice crop in the recollection of our oldest planters, owing altogether to the salt water, which, owing to the general drought of the last summer, ascended our rivers where heretofore it was not known. The potato crop is as good as usual, and so is the rice crop, high up the Pee Dee, Wackamaw, and Black rivers."

So, in August: The Wynyah Observer of the 17th instant says: "We had not supposed the injury so great as it turns out to be since the heading out of the rice. The crop is very short, and we shall be the better able to speak of it as the harvest may progress. Since our last there have been some heavy rains; and the fall of rain in the up country has given at last rain enough to allow many of the planters to flow with fresh water; but the season is too late to effect much good."

Still later: "The Savannah (Georgia) Republican gives the opinion, formed from the best sources of information, that the crop of rice in that State will be considerably short of last year, and that prices will rule correspondingly high; and that the crop of South Carolina will show a greater falling off than that of Georgia. The Wynyah Observer says that the fears of a short crop will be fully realized, and that it is certain that there will be at least 10,000 tierces less raised in that neighborhood than usual; that, in consequence of the drought, it has been the most inauspicious year for the rice crop in the recollection of the oldest planters."

The information otherwise obtained corresponds to the above, and the falling off is variously estimated at from 25 per cent. to one-third, as compared with the crop of 1844. In Alabama the decrease was probably not quite so large, and perhaps the same remark should be applied to the crop of Louisiana; but the whole crop is undoubtedly less than that of the previous year.

The whole rice crop, according to the estimate, is 89,765,000 lbs., which is about one-fifth less than the crop of the preceding year.

In the Journal of Commerce we find mention of a *wild rice*, which is stated, by a correspondent of that journal, to abound in the northwestern part of our country. He says: "In noticing the plants of interest in the country through which I have travelled, that of the wild rice presents an interesting appearance. It is everywhere found on the upper lakes, and, as is well known, constitutes an important article of food with the Indians. We found it growing extensively along the borders of the lake St. Croix, and skirting for a considerable distance the shore of the river. It was in full bloom. The seed part of the plant appeared at the very top of the stalk, while the blooms or pollen were attached to the stalk below the seed head. It appeared to be very slightly attached to the marshy deposite at the bottom of the lake, by its roots being easily pulled up. The entire length of a stalk is four or five feet, with one-half of it beneath the water. Its blades, stalk, and head rise from one to one and a half and two feet above the water. It grows so thick, that when viewed at a short distance it presents a uniform surface of green, entirely concealing the water beneath. It ripens in September and October, when it is gathered by the Indians, who go among it in canoes to obtain it. Its blades are tender and sweet tasted, and would no doubt make very nutritious fodder for cattle. Why could not this rice be sown and raised along the shores of the fresh-water lakes of western New York, and in the New England States? Its grain would be found useful for a great many purposes, and especially for poultry. Immense numbers of wild ducks and other wild fowls flock to the rice fields of the lakes in the autumn."

Another correspondent of the same journal remarks on the above: "The account given of the wild rice of the great lakes, by your correspondent (Putnam) is very interesting. I have about a pint of the grains of the wild rice, which in 1844 I brought from Rice lake, which is the head of the river Trent, in Upper Canada. This rice was gathered by the Ontonabee Indians. The Indians run bark canoes into the aquatic grain fields, and with a long pole turn the rice heads over the side of the canoe, and then with a stick beat the grain out of the heads into the canoe. The grain is of a dark olive color, and is from one-half to three-fourths of an inch in length. I ate of it, when at Rice lake, at the house of a friend, who purchased it every year from the Indians. It was boiled and served up as a dessert, with fresh butter and the sweet sirup of the maple tree; and, thus prepared, was not inferior to the best southern rice. I sent a few kernels of it to the Farmers' Club of the American Institute, in May last, to be distributed. The plant in Rice lake, in some places, grows in 12 feet water. It requires what is termed a rich black mud to take root in. I expect to receive some more of this rice in about ten days, from Rice lake."

In the New Farmers' Journal, an English periodical, mention also is made of a new species, lately brought to view at Sierra Leone, called the Fundi rice, or sometimes the hungry rice. It may, perhaps, deserve atten-

tion from the planters in our southern States. It would seem to be an upland rice, from the description which we subjoin:

"*New species of rice.*—Mr. R. Clarke, the senior assistant surgeon to the colony of Sierra Leone, has lately brought into notice a grain called fundi, or fundungi, cultivated by industrious individuals of the Soosoo, Foulah, Bassa, and Joloff nations, by whom it is called hungry rice. It is a semi-transparent cardiform grain, about the size of a mignionette seed; the ear consists of two conjugate spikes, the grain being arranged on the outer edge of the spike. The ground, says Mr. Clarke, is cleared for its reception by burning down the copse wood, and hoeing between the stumps. It is sown in May or June, the ground being lightly drawn together over the seed with a hoe. In August, when it shoots up, it is carefully weeded. It ripens in September, growing to the height of about eighteen inches, and its stems, which are very slender, are then bent to the earth by the mere weight of the grain. When cut down it is tied up in small sheaves, and placed in a dry situation within the hut; for, if allowed to remain on the ground and become wet, the grains become agglutinated to their coverings. The grain is trodden out with the feet, and is then dried in the sun to allow of the more easy removal of the chaff in the process of pounding, which is done in wooden mortars. It is afterwards winnowed with a kind of cane fanner, on mats. In preparing this delicious grain for food, it is first put into boiling water, in which it is boiled for a few minutes; the water is then poured off, and the Foulahs, Joloffs, &c., add to it palm oil, butter, or milk; but the Europeans and negroes connected with the colony prepare it as follows: To the grain, cooked as above mentioned, fowl, fish, or mutton, with a small piece of salt pork for the sake of flavor, is added; the whole being stewed in a close saucepan. This makes a very good dish; and thus prepard, resembles 'kouskous.' The grain is sometimes made into puddings, with the usual condiments, and eaten either hot or cold, with milk. By the few natives of Scotland in the colony, it is dressed as milk porridge. This grain could be raised in sufficient quantities to become an article of commerce, and I have no doubt would prove a valuable addition to the list of light farinaceous articles of food in use among the delicate or convalescent. Before preparation, the grain is said to be of a clear dull brown color, and when cleaned from the husks it resembles very fine millet."—*New Farmers' Journal.*

SILK.

The subject of silk culture is one which does not excite that general interest in our country which it may hereafter be destined to enlist, and which its importance might seem to render proper. There are a number of reasons which may be assigned for this.

A severe check was given to its progress some years since by the unfortunate *multicaulis* speculation. Many who suffered from engaging in that enterprise with too hasty a zeal, have not recovered from the timidity which the issue in disappointment of their sanguine hopes inspired; and others, who have learned of the loss of their neighbors, have been as averse as they to engage in new experiments. Yet, even that result is due rather to the period in which it took place, than to any thing in the nature of the subject. At a time when the public mind was not directed, as it then was, to all sorts of speculations, the multicaulis might have been successful;

though it is to be questioned if the climate at the north is adapted to it, in many parts of the country where the cultivation was attempted.

Another reason for the want of success in the general diffusion of the silk culture, is the absorbing interest which has been felt (in those sections of the country where it might best be tried) in some other crop. This is peculiarly the case as regards the southern sections of our republic; the climate of which is so well adapted to silk culture. Still, we believe that there is a gradual advance on the subject. Comparatively little information on the topic is to be obtained except in those papers which are more specially devoted to it, and there are but few journals which even give a column to it. Our information on the silk culture the past season is mainly derived from the New York Farmer and Mechanic. From the collection of articles on the subject there, we have condensed and present here, and in appendix No. 12, such statements as may best subserve our object at this time. The reports which we have received from the different parts of the country are so few and so meagre that we are unable to give any thing but a general view, without entering into much detail as to particular States. It is stated that there is three times as much raw silk manufactured now as there was three years ago, and that it is worth 50 to 75 cents per pound more than Smyrna silk. The specimens submitted at the last fair of the American Institute in New York were such as would compete successfully with the French and Italian silks. The frosts of last winter proved too severe for many mulberry trees in the northern States; and the Broussa, which seems adapted to cold weather, is recommended as adapted to these sections of our country. Five States—Maine, Massachusetts, New York, Delaware, and Louisiana—give bounties on silk. That of New York is about to expire. We have subjoined in the appendix the memorial to the legislature of that State for its renewal; also, the act recently passed in Louisiana for the purpose of aiding the silk culture there. A number of interesting communications from gentlemen at the south relating to this enterprise, taken from various journals, will also be found in the appendix. The following extracts are taken from the Planters' Banner of February 23, 1845: "To give the agricultural editors at the north an idea of our Louisiana climate, we would state that a lot of multicaulis trees in our garden have been in leaf for three or four weeks, and for the last few days we have been feeding silk-worms! Peach trees are now (February 22) in blossom, and most of the trees in this region begin to put forth leaves."

Again:

"*State Legislature*.—We learn from the Bee that the bill has passed the House of Representatives to encourage the culture of silk in Louisiana. Mr. Gaudet, who introduced the bill, appeared in the Hall of Representatives clad in a handsome dress coat made of silk grown on his own plantation."

Again:

"*Louisiana silk*.—Few have a notion of the various kinds of handicraft that is carried on in a small way in those parts of the city where the emigrants from continental Europe principally reside. Chance brought us into the house of a Belgian yesterday, and we found him engaged in weaving American silk (which he had spun himself) into shawls for ladies."—*New Orleans Picayune.*

Mention is made of various experiments in the manufacture of silk fabrics in different parts of the country. Those of Northampton, Massachusetts,

Paterson, New Jersey, and Mr. Gill's, in Ohio, seem to be among the most successful. "At Paterson they employ about 540 spindles for winding, 240 spindles for cleaning, and 1,000 spindles for spinning; 16 looms in operation for weaving, and are increasing their number; also 100 hands, mostly women and children. Some fancy-colored cravats and dresses were woven for a French gentleman of silk of his own raising, which the manufacturers pronounced equal to the finest Italian silk."

The silk statistics of Northampton, according to Dr. Stebbins, of that place, are—"three silk manufactories, with a capital of $14,000, employing ten males and forty-seven females; 75 to 100 pounds of American silk, worth $500; over 6,000 pounds of sewing silk and twist, worth $41,500."

The following is a specimen of the frequent notices which meet the eye on this subject: "*Figured silk ribbon factory.*—We have seen several specimens of figured silk bindings, manufactured by Messrs. Vogel & Co., in this city. They furnish conclusive proof that those men can manufacture any desirable article of the kind. We understand that they are rapidly getting their machinery in order for manufacturing all kinds of figured ribbons and figured vestings, by a process unknown in Europe, and with increased rapidity."—*Bangor Whig.*

In the Ohio valley there is considerable silk raised. Indeed, it is said that not less than 50,000 bushels of cocoons are now annually raised there. Mr. Bliss, in his report to the Ohio legislature on this subject, recommends a course which would do much to extend its cultivation. It is, that every farmer should have his patch of mulberry trees, and make it a point to raise at least ten bushels of cocoons.

The history of silk culture of this country is divided, by some writers, into three epochs. The first period, from its first introduction, in 1623, to the close of the revolutionary war, in 1783, or for 160 years. The second epoch, from that time to the decisive knowledge of the multicaulis mulberry; or to July, 1830. The legislature of Connecticut, in 1783, granted a bounty on mulberry trees and raw silk. The efforts of Dr. Aspinwall and President Stiles were the principal cause of this movement. The consequence of the introduction of the mulberry tree more largely, through their exertions, has been, that Connecticut stands among the first in this culture at the present day. The third epoch commenced about 1830–'31. It remains to be seen how great the progress shall be; but it is hoped that our countrymen will before long awake more to the importance of its prospective bearing on our national resources, and engage in it vigorously, and also with true discrimination and prudence. For this purpose they should acquaint themselves, as far as practicable, with the experience of others, and the obstacles or aids to their success.

We have placed in the appendix several valuable papers, which have been drawn from valuable sources, on this subject, and they will repay the perusal. The history of the silk culture in Georgia, by the Rev. William H. Stevens, which we have taken from the Southern Cultivator, is an interesting piece of instruction to the planters of the south. We may also mention Mr. Douglas's, Mr. Crain's, and Judge Ernest's communications, and others, as well suited for the same object.

Dr. Stebbins's letters and reports, Mr. Green's, Mr. Clemens's letters, &c., also relate to the more northern culture. We may again, also, refer those who desire much practical information in a small compass, to the pamphlet,

published two or three years since, called the "Silk Question Settled," and from which copious extracts were made in a former report.

The writer in the journal on the pages of which we have been forced mainly to rely in our remarks on this subject, observes that "it is evident, from letters received at the first national silk convention, and other reliable sources of information, that several thousand tons of silk are now annually raised and manufactured in the United States." He thinks that, owing to the want of proper management of the worms after they have spun their thread and formed the cocoons, one-half probably is lost.

A great obstacle to more success, is *the imperfect manner in which the reeling is performed.* "Hundreds of families," he says, "who raise several bushels annually, work them up into sewings and other articles for their own or their neighbors' uses. These, finding their way to the country stores, injure the cause of silk production; for, being compared with foreign silks, produced by proper machinery, they are found defective. There is much also wasted by these methods, as reeling, doubling, and twisting (instead of being made, as they should be, three distinct operations) are often performed on a single machine." He urges a division of labor, as without it we cannot succeed.

Another difficulty suggested, is, that persons are often forced to *keep their cocoons too long*—until they are injured and lose half their value. He cautions persons against the use of heat in the destruction of the chrysalis. The fibres are thus made so tender that cocoons which might have yielded silk worth $6 per pound, will only yield that which is worth $3. Alcohol is recommended, as it leaves the cocoons in fine order for reeling. It is said that the Northampton factories are very particular on this subject. The cocoons must be spread out very thin to become well cured. Cocoons, it is stated, become comparatively valueless after the 1st December, as the gum is so dry and hard as to injure the silk. The Northampton factories make it a rule not to purchase after the 1st December.

R. B. Forbes, of Boston, who is said to be personally intimate with the Chinese climate, mentioned in the New York Farmers' Club that the climate in China, between the parallels of 30° and 40° north latitude, is the most decidedly favorable for silk, and that silk from these latitudes is 20 per cent. better than that from the lower latitudes there. It is a little remarkable that we find it elsewhere stated that the best silk in this country is from cocoons spun in Vermont. It is said to be larger and stronger than silk raised in any of the southern or western States. The Vermont silk, we are informed, brings a higher price at Paterson, New Jersey, than silk from any other State.

Open feeding is still recommended. Silk-worms are said to suffer more in sultry, close weather, than in cold. Ventilation is all important.

A species of worm among the Persians is said to produce eight successive crops in a year; and a writer in Florida, Thomas Douglass, of Macavies, thinks that it would be useful to introduce this species into that State. The leaf of the morus multicaulis, he states, affords good feed for worms there *at least* eight months, and sometimes nine and even ten months in the year. He is sanguine that Georgia lower country and Florida silk will be quoted in the prices current of Liverpool and Havre in 30 years, if not indeed sooner. His letter, which contains many interesting particulars, and deserves serious attention from the planters of the south, will be found, with other papers, in appendix No. 12.

Some very useful directions as to silk culture, also, will be found in an article from the New York Farmer, by Mr. A. C. Van Epps, to whom we are indebted for much information on the subject. His paper, styled "A Chapter for Silk-growers," compactly embodies his observations on the various topics of a *supply of perfect eggs ; provision of suitable foliage ; place for feeding ; destroying the chrysalis*, and *curing cocoons*. He believes that the hatching of the eggs may be retarded without in the least injuring the constitution of the worm. The failure he attributes to either the worms being placed too late in the ice, or to the warmth of spring or summer, or their not being wholly imbedded in the ice. He describes the feeding frames and ventilating cradles, &c., and a method of curing the cocoons, in so easy a manner that any one can understand it.

An interesting letter by S. A. Clemens, of North Granby, Connecticut, also from the journal before mentioned, furnishes many valuable remarks, which we commend to the attention of those who are investigating the subject with a view to successful experimenting. He recommends cultivating the mulberry tree in rows about 3½ feet apart, and as thick as they can stand in the rows. "The trees," he says, "are kept headed down by cutting off the shoots several times in the season, as they spring from the ground. The foliage is thus easily obtained, and probably more of it than if the trees were planted wider apart and suffered to form trunks. The multicaulis has been cultivated in this way with entire success."

Mr. Clemens approves of *feeding with the shoots*, and says that as the young shoots are taken others form in their places, which gives a fresh supply of tender foliage until late in the season, and so obviates the difficulty in making as good cocoons from late as from early feeding. He prefers the *peanut* variety of worm, though he says that some in his vicinity choose the mammoth sulphur, as the silk reels more easily, and, though the silk is coarser, it answers well for sewings. He speaks of Mr. O. D. Payne's reel, of Northampton, as the best one.

Mr. Payne himself has also a communication in the New York Farmer. He says that the Alpine mulberry is preferred there; it is the saccharine matter which nourishes the silk-worm, and much depends on the proportions which the different elements of the leaves bear to each other. The leaf of the Alpine mulberry is most nutrient; and the more nutrient the leaf is, the less leaves the worm has to consume, and consequently the less labor to perform, and therefore is less liable to fatigue, languor, or disease. The small silk-worm, or the 8th crop, is the best. This he pronounces to be a very superior species, furnishing very superior silk, and of a very fine texture. His reel, he states, possesses many advantages over every other reel, and that Mr. Valentine, an English silk manufacturer in that place, procures some of the silk reeled on it—which he considered superior to any other he had known for evenness, color, and finish—to send to England. He says that the Northampton Association have succeeded in lustre, smoothness, and fineness of texture, not surpassed by the best Italian.

Another writer, Mr. W. H. Benton, of Raymond, Mississippi, approves of *cut* leaves, from which Mr. Van Epps dissents, and could not consent to admit it as a substitute for open branch feeding.

Mention has been made in various public journals of a plant, called the silk plant, sent from Tripoli; and, in the Farmers' Library and Monthly Journal of Agriculture for July, there is a plate representing the same, by which it appears to be a species of the asclepias, or what is termed milk-

weed, or silkweed. We subjoin the letter of Mr. McCauly to Mr. Markoe describing it. It has, however, been since stated that the fibre will not answer the purpose for which it is suggested, as it resembles the fibre of our milkweed, which has been tried in the way unsuccessfully.

"*Silk Plant.*—The following letter from D. Smith McCauly, esq., our consul at Tripoli, to Francis Markoe, jr., the secretary of the National Institute, will be read with much interest. He transmitted it with some seed of the vegetable silk, which, in all probability, in our varied and wonderful soil and climate, will become a new article of commerce, and, like our cotton, a new and important source of wealth. Should it succeed, and become a great staple article like our cotton, what important consequences may we not expect to follow from its introduction:

U. S. Consulate, Tripoli,
December 28, 1844.

Sir: I herewith transmit to the Institute a small specimen of vegetable silk, raised from a few seed that I received from Lucca, Italy, which seed originally came from Syria. Without any instruction or knowledge of this plant, I sowed the seeds in pots, in the month of March last. In May and June they obtained the height of 6 to 8 inches, when I transplanted them into my garden, about 8 inches apart—much too near, as my experience proves. In the months of August and September they were in flower, and the pods commenced opening in October, the plants being from 6 to 8 feet high; and, though we have had the thermometer frequently as low as 42° Fahrenheit, and the apricot and pomegranate trees, with the vine, have all shed their leaves, yet there remain several pods on the silk plant which are still perfectly green, and show no signs of suffering or cold. This, with some other proofs of the plant being hardy, induces me to believe and hope that it might be successfully cultivated in all our cotton-growing States; and should it become a staple commodity, no doubt the inventive genius of our countrymen would soon discover the means of spinning it without the aid of the cotton fibre, which, I am told, they use in Syria to assist in spinning, their knowledge of the art not extending beyond the primitive distaff. The only information that I have acquired of this plant further than recounted above, is from the mouth of one of the "propaganda" established here, who has seen it growing in Syria, where, he tells me, it flourishes, and that the cultivation of a small field gives support to a family; that in the second and third years it is extremely productive. The plants grow to the height of 10 to 15 feet, and are generally separated from 8 to 10 feet from each other. I also forward you, by this occasion, the small quantity of seed of the plant which the limited number I have raised enables me to spare, with the hope of sending a greater quantity next year, should the climate of our southern States prove favorable to its culture, or should it be even otherwise interesting. I beg you will distribute these seeds amongst those gentlemen of our cotton-growing States who will take an interest in making an experiment of the cultivation.

Very respectfully, sir, your most obedient servant,

D. SMITH McCAULY."

SUGAR.

The crop of sugar in Louisiana, it is believed, will not prove so favorable as was anticipated. That of last year (1844) was better than was con-

jectured to be the case at the time the estimate in the report was made. Much is made after the latest period in which we can receive such information as we must rely on to form even a conjecture. There was unquestionably a large additional number of estates turned to the sugar business. Mr. Chapommier states, in the New Orleans Bee, that in 17 parishes there have been 367 cotton plantations thus changed; and he says even this does not comprehend all, for this notes only new mills; and there are numbers of small planters, besides, who resort to the mills of their neighbors. In other sections he learns of 25 to 30, and in another 200 more.

The early notices of the sugar crop are partly unfavorable. Thus, in May: "The crop of cane in the Lafourche parishes, we are informed, is not very good"—*Planters' Banner*, *May* 24.

On the other hand, also, May 24: "We have just returned from a ride extending about 100 miles through Attakapas and Opelousas. We took particular notice of the crops. The cane in St. Mary, St. Martin, Lafayette, and St. Landry, looks remarkably well."

The St. Landry Whig, of the 17th, states that "the sugar crop of that parish will amount the present season to 1,400 hogsheads, being an increase of 700 over the product of last year."

In June, we learn "the sugar crop promises well." The St. Landry Whig, of the 10th instant, represents the sugar crop in that parish and in Avoyelles as promising an abundant return to the planter. "Should the worm fail to visit them, the sugar crops will exceed those of any previous year."

Again, June 13: "Sugar-cane looks remarkably well, and we have no doubt will turn out handsomely." Again, the Baton Rouge Gazette, of June 28th, says: "The drought for some time past has dried up the sugar-cane." The Lafourche Gazette, still later, speaks of the kind of weather as favorable to the growth of sugar-cane. The following is dated Franklin, July 12: "Down to the present time, our sugar planters of Attakapas have had quite a favorable season. The crop of cane is now nearly all laid by. Some of our planters will probably plough late, which will retard the ripening of the cane. A worm, which threatened much damage, made its appearance in the cane last month, but the heavy rains appear to have arrested its progress."

In September, it is stated: "Valerien Martin, of the parish of Lafayette, Louisiana, has already commenced making sugar. His sample was that of a fair quality. He commenced the 20th of September, and says his whole crop is ready for milling." Again: "The last Franklin Banner says that the cane throughout Attakapas promises well. Many of our planters will be prepared to roll about the first of October."

Later in October the accounts are various. Thus the Planters' Banner, of the 4th, says: "The weather, we regret to say, is quite unfavorable, not only for the ripening of the cane, but for the making up or boiling of the sugar crop. It has rained the greater part of the week, and planters will not commence rolling quite as soon as we anticipated a few days since. Many, we regret to say, have not finished hauling wood, housing potatoes, or gathering corn, and much hay and fodder has been lost by neglect and wet weather. The object of all now is to commence rolling as soon as possible."

Again, the Baton Rouge Gazette, of the 18th, says: "Sugar making has commenced, and is going on briskly on the neighboring plantations. The

cane fields present a scene of activity. The prospects of sugar planters this year are very encouraging. The Donaldson Vigilant, of last Thursday, has the following: Several of the sugar planters of our parish and of the Lafourche have commenced 'grinding.' The yield thus far has not been large. The weather, however, is now propitious."

"The Louisiana Planters' Gazette, of the 25th ultimo, states that the sugar crop of the parish of Iberville will be a very short one."

In a letter from New Orleans to a public journal, dated October 31st, the writer says: "The prospects of the cane are not favorable. I believe the crop will not exceed 150,000 hogsheads, which is 50,000 short of last season. I ought to add, however, that my estimate is below that of others who are well informed on the subject, who estimate it at 175,000 to 180,000 hogsheads. The crop is two or three weeks behind last year, and unfortunately we have not yet had cool weather to ripen it, and a large majority of the planters have not yet commenced grinding; and even some of those who had begun have suspended again, as the cane gave such a miserable yield. Last year at this time 40,000 to 50,000 hogsheads were already in the draining houses, and of course out of harm's way; whereas now almost the entire crop is at the mercy of an early frost, and will certainly suffer more or less from it, as the grinding will run so late into winter."

Later, also: "The sugar planters are all now under full way in their grinding, and the last ten or fifteen days has been favorable weather. The complaints of bad yield are very general on the river plantations; the crop will be less than last season; the best informed estimate it at 150,000 to 175,000 hogsheads."

The Planters' Banner, of December 6th, speaks more unfavorably as the season advances: "As we predicted, last week's rain was succeeded by a severe frost, which killed to the ground nearly all the cane standing in the parish; few of our planters having taken the precaution of windrowing. Since the frost on Sunday night, many have windrowed with a view of preserving the cane from the influence of the sun. This it will do to a certain extent. On Monday morning, the 1st instant, at daylight the thermometer stood at $37\frac{1}{2}°$. This was the severest cold we have had to injure the cane since 1842. In that year, in a central part of this parish, on the 19th November, at daylight, the thermometer stood at 26°, and the cane was killed to the ground. In 1832, on the 22d October, we had a frost which killed the cane throughout this parish before a hogshead of sugar was made. The crop was short, and the sugar was of inferior quality. The crop of this year will be cut short in our parish *one-fourth*, and in all other parts of the State in the same proportion."

From other information we also learn that a loss was anticipated from the severe effects of frost. The New Orleans Bee estimates the sugar crop of Louisiana at 156,000 hogsheads, as it falls short in fifteen parishes about 36,000 hogsheads. The actual returns for 1844 appear to have been about 191,000 hogsheads. Others estimate the decrease at about 20,000 hogsheads. The estimated decrease in the crop of the whole State by one informant is about "fifteen per cent." More have gone into the cultivation, which balances the loss; which otherwise would have been, perhaps, from 25 to 50 per cent. There will, however, be a larger quantity of molasses than before.

The crop of sugar in Florida promised fair, and the prospects of success were good. Quite a number have engaged in the business, so that the

whole crop of Florida is probably fifty per cent. more than before. The following statement presents the views of a public journal in that section of our country, respecting the appearance of the crop and its future promise as a staple for that new State: "We are informed that the sugar crop of this year promises fair, and that those of our planters who have engaged in the cultivation of its products feel well satisfied with their success. The short space of time which has elapsed since the termination of hostilities with the Indians has not permitted them fully to recover the position they occupied before the war, and consequently the crop of this year will be comparatively limited. Several of our planters commenced grinding the cane during the last week, and the smoke of the sugar mill curls up from many a lonely settlement between this place and Matanzas. We understand that large preparations have been made to increase the cultivation of their products during the next year, and we feel confident that the time is not far distant when the sugar crop of East and South Florida will form an important item in the agricultural resources of our State."—*Jacksonville News.*

The following is said to be a correct statement of the sugar crops in Louisiana for 1843 and '44:

Comparative statement of sugar produced in Louisiana in 1843 *and* '44.

	1843. Hogheads.	1844. Hogsheads.
St. Mary	15,311	18,795
Ascension	10,633	19,225
Iberville	9,644	16,463
St. James	9,350	21,519
Lafourche Interior	6,732	14,205
Plaquemines	6,641	14,761
Terrebonne	6,366	12,661
Assumption	6,256	11,990
St. Charles	5,882	12,532
St. John the Baptist	5,743	13,575
Jefferson	5,453	11,218
West Baton Rouge	3,087	4,247
St. Martin	2,621	4,419
East Baton Rouge	2,334	4,474
St. Bernard	2,026	6,941
Lafayette	908	372
Orleans	778	
St. Landry	395	1,179
Point Coupee	246	888
Vermillion	-	862
Divers small parcels	-	1,000
	100,346	191,324
		100,346
Increase		90,978

The following somewhat amusing account of the progress of improvement in sugar-making is from the Planters' Banner of September 20th:

" *The sugar business in Attakapas.*—Averse as most of our planters are to innovations and improvements, it is curious to notice the progress they have made within the last thirty or forty years. Indigo was the first article raised in St. Mary for export. It was not then thought that cotton-raising could be engaged in with profit; and if any one spoke of our soil as suitable for sugar, he would be looked upon as crazy. Cotton *was* engaged in with profit, and it was *thought* by some that sugar might be produced. The experiment of raising the latter crop was tried near New Orleans, and it was said the result proved satisfactory. Still, few had the courage to try it. The business gradually extended along the coast. At last, some seed-cane was brought to Attakapas, and some enterprising person invested a small sum in the purchase of *salt kettles* in New Orleans. These were placed between gum logs beneath an open shed; a mill was made of live-oak, and the experiment was tried. A few barrels of very inferior sugar were made and shipped to the city on a *keel boat.* The crop yielded a good profit, and those who had ridiculed the idea of making sugar in Attakapas followed the example. The salt kettles were set in brick and mortar, and sugar-houses of pine, with brick chimneys, were built. Much difficulty was experienced in boiling. Some made sugar of a very *dark* color, and others failed altogether the first season. Gradually, however, the quality of the sugar improved, but the chimneys were constantly cracking and falling down! The plan of building with double flues was discovered, and the difficulty was thus overcome. The planters, who had now become manufacturers, were quite elated; they built better houses, procured larger kettles, coated their live-oak cylinders with metal, purchased negroes, &c., and began to put up their sugar in hogsheads. Demand increased for carpenters, coopers, brick-makers, blacksmiths, &c. The sugar was of fair quality, and brought a good price. It was said that steam was used on the Mississippi, but of course the idea was ridiculed. But mules and horses were gradually superseded by steam-engines on the coast. Improved metal mills were now adopted, and some one in Attakapas *did* put up an engine! The quality of the sugar was now *fine.* Larger kettles were procured, but the sugar was not of so good a quality. The *small* kettles made the best article. *Clarifiers* were now used on the coast, and many experiments were tried. Some one in Attakapas *did* get clarifiers, but not more than three or four have, as yet, followed the example. Thus far, down to the present time. It is now said that *precipitators* are used on the coast; and this season, for the first time, they are to be tried in Attakapas. *Now* the big kettles will boil as well as the *little* ones! *We shall see.* In the year 1825 the crop of sugar and molasses made in St. Mary was taken to New Orleans by Captain Elam Patterson, in a keel boat of forty tons! Now, the crop of sugar is 20,000 hogsheads! So much for some of our wiseacres who are so inveterately opposed to improvements!"

Again: The statement of Mr. Chapommier of the crop of 1844, found in the appendix, presents some interesting particulars. We have added, also, the remarks of the New Orleans Price Current of September 1, 1845, respecting the sugar crop of the season past.

A discovery is mentioned in a New Orleans paper, by which molasses and sugar may be rendered perfectly transparent. We have seen no further notice of the same. " We are informed that a gentleman of this State has discovered a chemical process, which will enable him to make molasses and sugar perfectly transparent. It is his intention to take out a patent-right

forthwith. He has already made arrangements with several planters to operate on the forthcoming crop; and he is to receive, the first season, the difference in price between the old process and the new one. We further learn, it is estimated that the coming crop of sugar will fall short 20,000 hogsheads, in consequence of the damage the cane has sustained."—*New Orleans Native American.*

In the last report, mention was made of M. Rillieux's process for the manufacture of sugar. Since then, a letter was forwarded to the late Commissioner of Patents, in March last, containing a statement by Mr. Packwood, which relates to this method of manufacture, which it is presumed may be interesting to some; and it has therefore been placed in the appendix No. 12, above mentioned. Another letter, likewise received by the late Commissioner from Joseph Balestier, esq., U. S. consul at Singapore, giving an account of the mode of manufacturing sugar there, is added to the same class of papers.

The following analysis of the sugar, by Mr. Herapath, may be useful in showing the kinds of soil and culture best adapted to the same. It is probably made with reference to the West India cane.

"*Analysis of sugar cane, by Mr. Herapath.*—1,000 grains of sugar cane being burned, gave $7\frac{1}{2}$ grains of ash; and these being examined, were found to contain—

Silica - - - - - - -	1.780
Phosphate of lime - - - - - -	3.402
Red oxide of iron and clay - - - - -	0.176
Carbonate of potash - - - - - -	1.467
Sulph. of potash - - - - - -	0.150
Carbonate of magnesia - - - - -	0.430
Sulph. of lime - - - - - -	0.058
Grains - -	7.463

Judge Rost, in his address before the mechanical and agricultural association of Louisiana, gives an interesting description of the first attempt to make sugar in Louisiana; which shows from how small beginnings the great crop now raised of this article has proceeded. He says: "How is it with the sugar-cane in Louisiana? It was introduced here at an early day from the West Indies, and cultivated to a small extent at Terre aux Boeufs, and in the neighborhood of New Orleans. Nobody at first imagined that sugar could be made of it. The juice was boiled into sirup, which sold at extravagant prices. In 1796 Mr. Bore, residing a few miles above New Orleans—a man reputed for his daring and his energy—formed the desperate resolve of making sugar. He increased his cultivation, put up the necessary buildings and machinery, and procured a sugar maker from the West Indies. The day appointed for the experiment was come, and the operation was under way. The inhabitants of New Orleans and the coast had assembled there in great numbers. But they remained outside of the building, at a respectable distance from the sugar maker, who they looked upon as a sort of magician. The first *strike* came, and he said nothing; this they thought fatal, but still they remained fixed to the spot. The second strike was out; the sugar maker carefully stirred the first, and then, advancing towards the assembled crowd, told them with all the gravity of his craft: 'Gentlemen, it grains!' 'It grains,' was repeated by all. They

rushed in to see the wonder; and, when convinced of the facts, scattered in all directions, greeting everybody they met, with 'It grains.' And from the Balize to the Dubuque, from the Wabash to the Yellowstone, the great, the all-absorbing news of the colony was, that the juice of the cane had grained in Lower Louisiana. It did grain; it has continued to grain; it has grained the last season at the rate of 215,000,000 of pounds; and, if no untoward action of government prevents it, in ten years it will grain to the extent of more than double that quantity."

Maple sugar forms an important part of the sugar crop of the United States. It is true that it does not bear comparison with cane sugar; but in many States it furnishes a valuable substitute, which is as well relished, and saves the hard-toiling farmer from the purchase of the article foreign to him. The information we have been enabled to obtain respecting this crop, leads us to conclude that it is considerably above the usual crop. Vermont produces more maple sugar than any of the New England States. The Montpelier Watchman of May last estimated the sugar crop of that State for 1845 at $1,000,000 in value. The annual amount produced in the town of Leverett is 13,925 pounds; which, at 9 cents per pound, would be $125,325.

In the Boston Cultivator we find it stated that a sample of maple sugar, from Joseph M. Stevens, Caledonia, Vermont, made by him, had been received at the office of that journal, which the editor pronounces to be the purest and whitest he had ever seen. "The process is said to be simple and easy. Mr. L. manufactured, on his premises, last spring, 4,500 pounds."

In a letter addressed to the New York Tribune, dated Windsor county, Vermont, April, 1845, the writer says: "We are just through our annual sugar season, and all feel satisfied. The crop is large, and many have made 1, 2, and 3 tons."

From another source we learn that in Windham county there has been a large increase, owing to the improvements that have been made in the manufacture. The single town of Wilmington is said to have yielded, the last spring, 150,000 pounds. It is believed that the estimate for 1844 was perhaps not quite large enough, and that the crop of 1845 was not less than 10,000,000 pounds.

There was also an increased crop in New Hampshire and Maine, owing to the increased attention paid to its production. In some parts of Massachusetts, too, there are large quantities of maple sugar manufactured. The amount produced in the town of Leverett, as ascertained by the assessors, was 17,473 pounds. In New York there was a considerable increase over the crop of 1844, varying from 10, 15, to 20 per cent. Similar estimates are presented from other States and sections of the country where this product is raised. In a few only do we notice any falling off. This was the case in Kentucky and Ohio, which furnish a considerable quantity. In Indiana and Michigan the crop improved.

In order to obviate the objection which exists in the consumption of wood that must necessarily take place where the maple sirup is evaporated two or three times, the following method has been suggested, by which an individual of moderate means has been known to make over a hundred pounds of the purest white sugar in one season: "The tubs for collecting sap, as well as those in which it is kept ready for boiling, must be perfectly clean, and scalded with lime-water before using. If it should be warm weather during the sugar season, put into the reservoir a piece of lime about the

size of a hen's egg for a hogshead of sap. Pour it out through a strainer, and observe the strictest cleanliness through every part of the operation. When it is boiled down enough, let the sirup stand over night to settle. It is then to be strained off the sediment through a flannel. Dissolve the sediment again in water and boil it; boil down the strained sirup till it is thick enough for crystalizing. Let it then be put into tubs, and grow cold and harden; bore holes in the bottom and drain off the molasses, and when all the molasses is thus drained off, cotton or linen cloths of some thickness are laid on the top of the sugar and constantly kept wet. The sugar thus receives a regular and constant supply of water, and gradually soaks down through the crystalized, dissolving the molasses and other impurities, which drain off and leave the sugar perfectly pure and white."

The labor of this process is said to be light, though some weeks must be allowed for it. The specimens of maple sugar which have recently been exhibited in some of the agricultural fairs in Vermont and New York are said to have been uncommonly fine, and as white as the purest loaf sugar. We believe that the manufacture of this article may be carried on profitably to a much greater extent than it has hitherto been; and in most instances the farmer has leisure to attend to it, as it occurs at a period of the year when he cannot attend to other crops. In appendix No. 13 will be found a valuable paper, from an able western agricultural periodical, on maple sugar and the extension of its production in our country.

The whole sugar crop of the United States, including both cane and maple sugar, amounted, according to the best estimate at which we can arrive, to 216,026,000 pounds.

Cornstalk sugar.—The attempts are still continued to produce sugar from the cornstalk. The same difficulty respecting granulation, &c., still remains as before. But we can scarcely doubt this will yet be overcome. Mr. John Beal, of New Harmony, Ia., whose letters were given in the last report, still continues sanguine in regard to this matter. That molasses of a good quality for use can be produced, seems to be very evident.

The following notices appear in different public journals:

"*Molasses.*—This useful domestic article is now made out of cornstalks, and a very superior quality has been produced by Mr. Samuel Moreland, of Carthage, Tennessee. Mr. Moreland says the juice yields about one-fourth, as well as he can guess from the experiment he has made. The process appears to be simple enough. Press the juice out of the stalk about the time it arrives at maturity; boil it as you would the water from a sugar tree, until it becomes as thick as you want it; then your molasses is ready for use."

Again: "*Cornstalk sugar.*—The Albany Cultivator gives a little additional information on this subject. In an experiment mentioned, one pint of flour was mixed with two gallons of skim milk, and one pint of this mixture was added to thirty gallons of juice. This prevented any decomposition of sugar during the process of evaporation, and is supposed to make success surer. As the juice comes from the mill, it should run into a receiver which will hold just enough to fill one of the kettles or pans; while in this receiver the mixture of flour and milk, and also the necessary quantity of lime, must be added and well stired in. It is then poured at once into the boiler and heat applied; a very firm thick scum is by this means separated, and the juice becomes clear. It is then run into one of the evaporating pans, and the boiling kept up briskly. As the boiling proceeds, it is re-

commended to throw occasionally a shovelful of red-hot coals into the pan, having first blown the ashes off. As you put in more juice, add more coals; and as the pan becomes filled with coal, take out that which was first put in. This is done in the first stage of the boiling process. The pan for finishing should be shallow, and have but a depth of two or three inches of sirup in at one time."

Again:

"*Cornstalk sugar and molasses.*—We have received from John Beal, of New Harmony, Indiana, samples of cornstalk sugar and molasses manufactured by him the past season. The sugar is equal in quality to any of that kind we have seen, with the exception of a single sample, which we understood to have been made by Mr. Webb, of Delaware. The molasses is clear and thick, but retains a little of the peculiar pungency in taste which seems to attend more or less that which is made from cornstalks. But we can hardly doubt that improvement will be made in the process of manufacture, by which these articles will be produced of a better quality. It should be considered that the business is yet new, and, of course, partakes of the imperfection attending all untried enterprises. The communication of Mr. Beal having been mislaid until too late for this number, will appear in our next."—*Cultivator, December.*

In appendix No. 13 we give Mr. Beal's letter above mentioned, from the Cultivator of January, 1846; also, a letter from Mr. Beal to this office, enclosing a sample of his sugar, which had very much the taste of some of the coarser sale sugars. Mr. Beal states that he has been more successful the past season than before. On a measured acre he obtained about 700 pounds of crystalizable sirup. It was also of a better quality than before. He still finds some difficulty in the drainage, and thinks if it could be kept in a temperature of 70 to 80 degrees the process would be accelerated. His yield, he says, was equal to 57 gallons per acre; and, estimating his sugar at five cents a pound—a low estimate, as cane sugar there usually ranges from eight to twelve cents a pound—he gives the net value of the sirup on the acre at $14 90; which, compared with merely raising corn, leaves a balance in favor of sugar of $3 40. He thinks, also, that on a large scale it would be still more profitable. He further says that the continued culture of corn for the purpose of making sugar is now a settled point with him; and that in general it is as profitable as any thing else there, though in some years there may be exceptions in favor of particular articles. His letter contains his calculations in detail.

In Prescott's Conquest of Mexico, the interesting fact is stated that the Mexicans were accustomed to make sugar from cornstalks. In communicating a notice to this effect to the Cultivator, a writer from Staten Island, signing himself Richmond, and now known to the public as Dr. Samuel Ackerly, expresses his sanguine belief that before long we shall see and consume cornstalk sugar in abundance. The extract to which we allude is as follows: "The great staple of the country, as indeed of the American continent, was *maize* or *Indian corn*, which grew freely along the valleys and up the steep sides of the Cordilleras, to the high level of the table land. The Aztecs were as curious in its preparation, and as instructed in its manifold uses, as the most expert New England housewife. *Its gigantic stalks in these equinoctial regions afford a saccharine matter not found, to the same extent, in northern latitudes, and supplied the natives with sugar little inferior to that of the cane itself, which was not introduced among them*

till after the conquest in 1519." Dr. Ackerly adds: "If a semi-civilized nation on the continent of America, more than 300 years ago, made sugar from the stalks of Indian corn, why may not the more civilized races of the present day, with the aid of art and science, do the same? There is no doubt that it may be done—it has been done. The experiments that have been made show that it can be done; but in which of the States it can be most advantageously adopted, remains to be decided by other experiments. I remember when maple sugar could only be obtained of the blackest and coarsest kind, such as was strained through the dirty blankets of the aborigines, and sold in small cakes or birch baskets as a rarity." "Now," he states, "even rock candy has been exhibited at the State fair, which had never before been made from the sap of the maple tree. Maple sugar was always made in small quantity, but of late years a large amount is manufactured and refined equal to the best imported sugar. So will cornstalk sugar be gradually improved and introduced."

The account we have given of the introduction of the cane-sugar culture in Louisiana, is certainly encouraging to those who are experimenting with the cornstalk.

The cultivation of the sugar-beet in France, and other parts of the continent, is well known. In the former kingdom, large quantities are manufactured. Some attention, and increasingly so, is paid to the same culture in Great Britain. On this, a public journal thus says: "The amount of beet-root sugar manufactured in Great Britain and Ireland in 1844 was 5,597½ cwt.—an increase of 1,753¾ cwt. compared with 1843. Of this, 3,420 cwt. were manufactured at Stratford, in Essex; the remainder at Liverpool, and Portaferry, Downshire."

The *Journal du Commerce*, of Antwerp, mentions the discovery of a *new* kind of beet, which is much superior in all respects to the ordinary sugar-beet for the extraction of sugar. This may be the same as a species which is partially described by Dr. Medicus in the *Central Blatt*, of Bavaria, which is said to be fourteen days earlier, and on this account possesses decided advantages over the usual species; and which he recommends for cultivation by the producers of this article. According to the French papers, the state of the French sugar manufactory in 1844–'45 (of beets) was as follows: Manufactories in work, 294, or 31 less than last year; manufactories not in work 21, or 29 less than last year; quantity of sugar was 32,373,449 kilogrammes, or an increase of 5,598,054 kilogrammes on last year.

OTHER PRODUCTS, AND NEW ARTICLES FOR CULTIVATION.

The *root* crops stand next in importance to those enumerated in the table. As they did not enter into the returns of the census of 1840, we have no basis on which to found any general calculations; but they occupy a valuable place in the agricultural and horticultural pursuits of our fellow citizens.

We may form some idea respecting the crop of *turnips* from the fact that, according to the late census of the State of New York, there were raised in that State, in 1844, 1,350,332 bushels of this product on 15,322 acres of land devoted to such a purpose. In regard to most of this crop, it is presumed that there was no special attempt to raise large crops. The culture of turnips is prosecuted in Great Britain with great care; and very large

crops are often secured. Some valuable papers on this subject are to be found in the English periodicals, from which we feel strongly tempted to quote, but that they are too long, and depending in their results on comparison with extensive tables, which it may not be advisable to transcribe. It is a favorite and successful crop in that country, and great attention is paid to its production, as well as reliance on it for feeding stock.

We have met with some statements of the successful cultivation of *carrots* in our country, one or two of which we here subjoin.

"For The Farmers' Monthly Visiter.

"More than 1,218 bushels of carrots to the acre!

"Mr. Editor: When you were at our establishment a few days ago to look at the swine that obtained two premiums at the late fair in Boscawen, you mentioned several instances of large crops of carrots raised the present season, and you spoke of ours as looking well. This induces me to send you this statement of our success. We had just one-fourth of an acre sowed on a piece of ground, a part of which, two years ago last spring, was covered with laurel and white birches. The soil is a light loam on a sandy substratum. It was ploughed deep, and highly manured, and dressed over with leached ashes. The seeds were sown in drills one foot apart, with a seed sower constructed by one of our patients; and when the weeds were hoed out it was designed to leave the carrots standing about four inches apart in the drills. The carrots gathered from this quarter of an acre measured 304½ bushels, besides what had been gathered previously for cooking. Most of the carrots were long, smooth, and large. The heaviest weighed 3¼ pounds. This is at the rate of 1,218½ bushels to the acre. What crop is there more profitable? The 6 or 8 patients who assisted the farmer in digging them were highly delighted with such a return for their summer's labor.

"Very respecfully,

"GEORGE CHANDLER.

"N. H. Asylum for the Insane,
"*Concord, November* 7, 1845."

Again: "Mr. C. F. Crosman, of Brighton, has raised, the past season, 410 bushels of carrots on one fourth of an acre. This is at the rate of 1,640 bushels per acre. Mr. C. has also grown something like 1,000 bushels of beets on one acre of land. He is extensively engaged in the seed-growing business, producing several thousand dollars' worth annually."—*Genesee Farmer, January*, 1846.

The white, or Belgian carrot, as raised in England, sometimes produces 30 tons to an acre. In the Journal of the Royal Agricultural Society, volume 5, we find a paper by sir Charles Burrall, recommending highly the culture of this root, as a means of economizing hay. He says that, in the spring of 1843, five acres were sown—4½ with white, and one-half acre with red Altringham carrots—in order to compare them. The sowing of the Altringham did not prove successful, nor one-half acre of the white; consequently, he had but 4 acres, which produced 1,200 bushels to the acre; and with these, adding equal quantities of Swedes turnips, and some hay and oil cake, he fed 24 fatting beasts to April; besides which, he further applied his carrots to feeding 24 cows and 2 bulls with great economy of

hay. He proves this as follows: "In 1842—238 acres, and grass produced 200 loads of hay; and when hay-making commenced in 1843, I had about 50 loads of old hay only in reserve. In 1843, 260 acres of seeds and grass produced 505 loads of hay, besides 21 acres of clover, producing 19 loads; and I had about 400 loads of hay in reserve, when hay-making commenced in 1844; showing a beneficial reserve of hay, chiefly to be attributed to the united effects of a very good crop of hay in 1843, and the reduction of its consumption by the use of white cattle-carrots, &c." He says, also, that he has a very promising crop of flax after the carrots, without any dressing.

Among other crops which are included in the New York State census, are *peas* and *beans*—of the former, the returns give for the State 1,761,503 bushels, and of the latter 162,187 bushels. In the Southern Planter, for May, 1845, we find mention of a variety of pea, called the Rocky mountain pea, which perhaps may be profitably introduced into culture among us. "We have also received from Mr. Haxall a paper of peas, called the Rocky mountain pea, concerning which he has furnished the following statement: In calling public attention to these peas, I am well aware how often our citizens have found themselves deceived by ardent descriptions on the one hand, or dreamy promises of profit on the other. These peas, however, will answer any reasonable expectation. I planted five quarts of them about the 20th of May, in a piece of rough new ground, of sandy soil and only middling in quality. The product in peas and in rich good hay exceeded any thing I have ever seen. Whether we wish to save them as hay for cows, horses, or mules, or to turn stock upon them as upon cow peas, or to improve the land by their decay, they are, in my opinion, far better than any common pea. To instance only one thing: I planted them alongside the red cow pea; a dry spell in August arrested the further product of the common pea; the vines were leafless and dead; while the Rocky mountain pea was green and flourishing, and bearing peas, in an increased proportion, until the severe white frost the last day in October. They grow more like a cotton plant; do not entwine about the corn, and consequently may be saved with ease for hay. They should be planted by the 1st of May, in good land, and not more than four in a hill; plant them as you would the common pea. They come up quickly, grow rapidly, and commence bearing as soon as the common kind.

"L. PIERCE."

In the Southern Cultivator, for November, 1845, a statement is made respecting the Chickasaw pea, which is here subjoined. "A correspondent of the South Carolinian, writing from Greenville, speaks in very high terms of the Chickasaw pea as a fertilizer. If this pea, after extensive trial, continues to answer the expectations that have been formed of it, we need not, in the southern States, complain that clover will not succeed with us. We will have in this pea what will answer our purposes just as well. We shall be glad to hear more of it from those who have tried it; and especially if it be not the same as what is known as the *tory pea* in Alabama and some parts of Georgia. The account by the South Carolinian's correspondent is as follows: 'There is perhaps no section of country in the upper districts which has improved more in agricultural condition than the Old Pendleton neighborhood—the result, we are told, of an agricultural society, composed of intelligent and practical farmers. We were struck with the

manifest improvement in the breeds of cattle and hogs. The Berkshire cross has here told well; for the very simple reason, we presume, that stock is attended to. We have never seen a finer stock of hogs in travelling through any country. More attention seems to be paid to the pea culture here than any section we have been in. We are told that it is the opinion of many good farmers hereabouts, that land can be improved to a high degree by the pea culture. We have no doubt of the fact, if properly applied. There is a pea—the Chickasaw pea—which bears most abundantly, and, once planted, is almost inextirpable. We have seen it put into corn ground after the corn was taken off; pastured by the cattle and hogs all winter; in the spring put in oats, and after the oats were taken off the pea came up in great abundance. Now suppose these were to be let alone; and, in lieu of the absurd system of pasturing stubble, the vine and stubble should be turned under in the fall; would not the land be vastly improved? We have no doubt, if the pea were sown on our stubble lands, a peck to the acre, and the crop turned in while in the bloom, that the effect produced would be equal to the best clover leas, so much esteemed in Virginia and the north. It is an admitted fact, that leguminous plants exhaust a soil in a very slight degree. The pea vine contains about 53 per cent. of potash—a most important ingredient in all soils for the production of grain or cotton. If this should be returned to the soil, in addition to the carbon and nitrogen contained in the vine, it seems to me that there would be a manifest improvement. It has been discovered by analysis that cotton-wool contains, potassa 31.09 per cent.; lime, 17.05; magnesia, 3.26; phosphoric acid, 12.30; sulphuric acid, 1.16; potassa, 19.40. While corn contains potassa, 20.87; phosphoric acid, 18.80; lime, 9.72; magnesia, 5.76 per cent. The following analysis of straws may not be uninteresting:

	Wheat straw.	Barley straw.	Oat straw.
Potash	$\frac{1}{2}$	$3\frac{1}{2}$	15
Soda	$\frac{3}{4}$	1	15
Lime	7	$10\frac{1}{2}$	$2\frac{3}{4}$
Magnesia	1	$1\frac{1}{2}$	$\frac{1}{2}$
Alumina	$2\frac{3}{4}$	3	$2\frac{3}{4}$
Oxide of iron	$2\frac{3}{4}$	$\frac{1}{2}$	$2\frac{3}{4}$
Silicia, or flint	81	$73\frac{1}{2}$	80
Sulphuric acid	1	2	$1\frac{1}{2}$
Phosphoric acid	5	3	$\frac{1}{4}$
Chlorine	1	$1\frac{1}{2}$	$\frac{1}{4}$
	100	100	100

'From the foregoing data we learn that potash is a most important ingredient in cotton and corn, and that the pea vine and cotton seed would be most invaluable manures. How easy would it be to avail ourselves of both. If a planter should sow twenty bushels per acre of cotton seed upon a luxuriant vine crop, and put it in wheat, is it not reasonable to suppose that the advantages derived would be as great as from a clover lea or gypsum? We are sure the elements are nearly the same, and we have no doubt of its effect. It is an admitted fact, we believe, that oats exhaust land more than any other grain crop. The mystery is solved, we think, by the analysis, for thereby oats are found to contain 15 per cent. of potassa, while barley straw contains only three and a half, and wheat one-half per cent. No

doubt the rapid growth of oats and close pasturing aids much in the exhaustion of the soil; and we derive an important lesson from the analysis —the want of potassa in the soil, which may be supplied by the pea crop and keeping off one's stock. Grass does not exhaust a soil, for the very simple reason that it takes up no potash. Grass contains—carbon, 45 per cent.; hydrogen, 5; oxygen, 38; nitrogen, $1\frac{1}{2}$; and ashes, 9 per cent. We look forward to a day when the pea crop will be found a most important auxiliary in the resuscitation of the worn out lands of the south. Clover cannot be grown here; the climate is altogether too hot to expect a luxuriant growth to answer for manure. We see no resource left us but the pea culture.'"

Mr. Boussingault, in his Rural Economy, after giving the various equivalents of products as compared with wheat, says: "Judging from the equivalents, leguminous vegetables must be possessed of a much higher nutritive value than wheat; and it is known, indeed, that peas and beans form in some sort substitutes for animal food. The difference indicated, however, is so great that it may surprise those who have never thought of the subject."

The Genesee Farmer of July last says: "The soil best adapted to peas is a loam, a little inclining to clay. Early sowing is important, even if before snow and frosts are past. Sow at the rate of two to three bushels per acre, according to size; and even more, if buggy. They succeed best when ploughed in with a light furrow from four to five inches in depth, and harrowed down smooth for convenience of gathering. On good soil, the general yield is from 30 to 40 bushels per acre, and weight about 50 pounds."

Onions, also, under some circumstances, are a profitable crop. The average yield of this crop in Essex county, Massachusetts, is stated to be 300 bushels to the acre, and sometimes as high as 500 or 600 bushels. The *ordinary* expense is estimated at double that for Indian corn. For ten years past it is said from 30,000 to 40,000 bushels a year have been raised in Danvers alone, at a value of 50 cents per bushel, or $150 per acre. In appendix No. 14 will be found an account of a method of raising onions and carrots together, by which 1,209 bushels of carrots and 630 bushels of onions were raised to the acre.

Our country, within a few years past, has made great advances in the production of choice *fruit*. Many in all sections of the United States have turned their attention to this object, and the result has been great improvement in orchards, and the introduction of better methods of cultivation. Treatises of real practical value have been published to aid in this design, and much horticultural knowledge has been diffused among the people. There seems to be a prospect that this subject will occupy yet more attention of our agriculturists; and to some it has been, and promises further to be, a very considerable source of revenue. Our apples already command a high price in England, where the palm is invariably awarded to them when brought into comparison with those of home production there. Our principal cities and towns exhibit (in their season) at times a great profusion of various fruits in the markets.

The past year proved especially favorable in some sections to *peaches*. The vast quantities of this fruit produced in Delaware by Major Reybold & Sons is well known to almost all in the city of Philadelphia, which is their principal market. A writer in one of the papers, giving an account of his visit to these orchards, says: "From the books of Major Reybold

and his son were ascertained the following remarkable facts: Quantity of peaches sent to market (to the 29th of August inclusive) by Major Reybold, from his Maryland and Delaware orchards, 31,145 baskets; John Reybold, 13,300; Philip Reybold, jr., 6,000; William Reybold, 5,699; Barney Reybold, 7,200. Total number of baskets, 63,344. Number of baskets employed for transit, 40,000 to 50,000. Number of acres of orcharding, 1,090. Number of trees in orchards, 117,720." Steamboats were constantly arriving and departing loaded with the produce of these orchards, which were sent to New York and Boston, as well as to Philadelphia and near markets. It is probable that before the close of the season as many as 80,000 baskets, if not more, were thus disposed of from these orchards.

The Tribune estimates the whole number of baskets of peaches sold in New York during the last peach season, of forty days, at 12,000 per day, or 480,000 baskets, at a cost of three-fourths of a million of dollars; and says, that there are more peaches offered for sale in New York annually than are raised in France.

Nor is Cincinnati less favored with regard to *strawberries*, a delicious fruit of the earlier season.

A Cincinnati paper states: "There are about 25 days of full sale of strawberries in this market. At 4,000 quarts per day, this gives 100,000 quarts of strawberries sold in this market in one season. They average 8 cents per quart, which makes $8,000 paid in a little more than three weeks for strawberries." Some very fine varieties of this fruit are produced by our horticulturists. In the Cleveland Herald we find the following:

"*Magnificent strawberries.*—Friend McIntosh has presented us with two baskets of the finest strawberries we have tasted this season. One contained the Ross Phœnix variety, a seedling, first grown by Mr. Alexander Ross, of Hudson, New York, and fruited by that gentleman for the first time in 1840. Mr. McIntosh introduced it here, at a cost of $1 50 per dozen plants, and is much pleased with the variety. It is a strong grower, prolific bearer, large berry, of excellent flavor, and bids fair to equal Hovey's celebrated seedling. Several of the berries in the basket before us measure 4 and 5 inches in diameter, and we counted 18 berries in different stages of growth on a single truce or stem. The other basket is filled with tempting grove and scarlets, an old and well known variety, and one of the most abundant and profitable bearers. Plants of the above and other valuable varieties can be obtained of Messrs. McIntosh & Co. The best time for forming new beds is early in August."

Another fine seedling is mentioned by the editor of the Cultivator, as observed at Palmyra, New York, in the garden of Col. J. S. Stoddard. He says: "Some years ago he raised about 2,000 new seedlings from the Alpine variety, one of which (a red variety) he selected, and has since increased. The ground occupied by this seedling is about 60 feet square, the plants standing in hills 14 inches apart. These strawberries bear their fruit above the leaves. In this case the masses of red berries presented so brilliant a glow as to be conspicuous several rods distant. He measured some of the fruit of this variety, which was one inch and a fifth long and more than three-fourths of an inch thick. Col. S. thought he should pick from this 60 feet square 35 bushels. He had taken from it and another smaller bed 2 bushels daily. They were sold for $4 per bushel."

The Cleveland Horticultural Magazine also contains some excellent remarks on the cultivation of another fruit, the *gooseberry*, which are here

extracted, thinking they might be useful to some: "Permit us now to offer our opinion regarding their culture. First select a soil, neither stiff clay nor loose sand, but of good, rich, deep mould, in a position where the mid-day sun will never reach. Plant your bushes 3 feet apart each way; train them into heads at least 2 feet from the ground; let the head be formed nearly round and open. After the head is once formed, attend to the bush from the time the blossom shows itself until the fruit is ripe, and whenever a branch is pushing forward to make wood, nip the end with the finger, thus throwing all the juices into the formation of the fruit, besides keeping the bush more open to the air; with the hoe dig well among their roots, being careful not to break them, but yet to keep the earth loose and moist. As often as once a week, from the time the fruit sets until ripe, bestow a watering of liquid manure upon the soil, and use the hoe directly after it. In pruning, let it be borne in mind that the gooseberry produces fruit not only on the wood of the preceding summer's growth, but also on spurs from old wood. The wood of the last past year, however, producing the larger berry, if possible to preserve a rightly formed head, it should be done. No bearing wood branches should be nearer than 6 inches of each other, and the shoots should never be more than 12 buds in length. Where old bushes have long remained, if not convenient to transplant to another position, (and for this year the season is now too far advanced,) take away the earth from about the roots, and shorten in all the larger ones by cutting to at least 1 foot in length each. This will cause them to form new spongioles in great numbers; and if the dressing of liquid manure is given as directed, they will afford a vast increase of nourishment to the plant. Should any appearance of mildew become visible, sprinkle the bushes with weak lime-water, and scatter lime and sulphur underneath upon the ground. If your bushes are now placed where they are directly exposed to the heat of mid-day suns, erect some temporary shade, or plant running beans and train them up as shades. The number of varieties is now increased to several hundreds; yet in 1743 there were but 6 or 7 sorts admitted as valuable."

Mention was made, in a former report, of *cranberries*. In the New York Farmers' Club some remarks were offered on this subject, in their discussion, which we here subjoin:

"*General Chandler*. I present to the club cranberry plants—some with their great crop of fruit on—at the request of Mr. Sullivan Bates, of Bellingham, Massachusetts. A few years ago he first exhibited this fruit, produced by his new method—transplanting from the low grounds which it affects, to high ground. His success has been complete. He has gathered from one acre about 400 bushels of cranberries in a season! He plants them in drills 20 inches apart, in hills 7 inches apart; and the quality of the fruit is improved by this new culture. The soil must be such an one as does not bake.

"*Chairman*. I took from swamps on General Johnson's place some cranberry plants, and planted them on ground 80 or 100 feet above the swamp; they thrived, and their fruit was so close together that one could hardly put a finger in without touching the cranberries. It is a highly profitable crop. I am of opinion that $500 might be obtained for a full crop of one acre.

"*General Chandler*. Mr. Bates will furnish any number of plants to those who desire it.

"*Mr. Worth*. The cranberry of Russia is larger than that of England;

but both of them are scarcely half the size of these cranberries, and of much inferior flavor. Those exhibited here would suit the English and continental markets, and would be sold to any extent.

"*Chairman.* I planted mine in loamy soil; prepared the earth well about the plants; watered them well; and did not lose 10 out of the 150 plants.

"*General Chandler.* And those which I sat out last spring lived and flourished.

"*Mr. Meriam.* The cranberry grows abundantly on our northern soils that are marshy. All agree that such is the habit of the cranberry.

"*Mr. Wakeman.* My family have tried Mr. Bates's cranberries, and have found them excellent; and they are larger than other cranberries."

* * * * * * * *

For an article on the culture of cranberries, see appendix No. 15.

We may here allude to another species of fruit, respecting which an English paper observes, that in Father Ripa's account of China, translated by Mr. Piandi, (a work republished in this country lately,) the Chinese *quinces* are said to be much larger than the English ones, and of an exquisite quality, consisting almost entirely of juice, so that when dried in the sun nothing but rind remains.

The fine apple orchards of R. L. Pell, of Ulster county, New York, have been mentioned in many of the public journals. He obtained the gold medal from the American Institute for the best fruit farm in the State. He has furnished an account of his management in one of the agricultural papers, and we give it here as important and highly useful. His statement is addressed to the committee on fruit trees, viz:

"Gentlemen: Being desirous to compete for the premium to be awarded by the American Institute, at its sixteenth annual fair, for the best fruit farm in the State, I now abide its rules, and offer, at the request of Mr. T. B. W., its worthy and very useful secretary, my mode of managing. For some years I have been experimenting upon the apple tree, having an orchard of 20,000 Newton pippin apple trees. I have found it very unprofitable to wait for what is termed the bearing year, and consequently it has been my study to assist nature so as to enable the trees to bear every year. I have noticed that it bears more profusely than any other tree, and consequently requires the intermediate year to recover itself by extracting from the atmosphere and the earth the requisites to enable it to produce. If unassisted by art, the intervening year must necessarily be lost. If, however, it is supplied with the proper sustenance, it will bear every year. Three years ago in April, I scraped all the rough bark off a few of the apple trees in my orchard, and washed the trunks and limbs within reach with soft soap, trimmed out all the branches that crossed each other early in June, and painted the wounded part with white lead, to keep out the moisture; then split open the bark by running a sharp-pointed knife from the ground to the first set of limbs, in the latter part of the same month, which prevents the tree from becoming bark bound, and gives the inner wood an opportunity of expanding. In July I put one peck of oyster shell lime around each tree, and left it piled about the trunk until November, when I dug the lime in thoroughly. The following year I collected from those trees 1,700 barrels of fruit; some of which was sold in New York for $4, and the balance in London at $9 per barrel. Strange as it may appear, they are literally bending to the ground with the finest fruit I ever saw; a

specimen of which is before you. The other trees in my orchard, not treated as above, are barren, next year being their bearing year."

Alluding to Mr. Pell's orchard, and urging the cultivation of fruit on his readers, the editor of the Southern Cultivator says: "Mr. Pell, of Westchester, New York, has an apple orchard of 20,000 trees. He sells his apples in New York at $6 per barrel. The best, however, he sends to England, where they command $21 per barrel. The nobility and the wealthy people bought them last year at a guinea a dozen, or about 45 cents a piece. Last year he sold 9,000 barrels. This year he has already sold between 3,000 and 4,000 barrels. Scotch physicians prescribe American apples for dyspepsia. It is no unusual thing for an English lady to have on her table, at a party, fruit which costs from £400 to £500. A dinner was given by an English nobleman, some years ago, for which the fruit alone cost £6,000. Invariably, where English and American apples are exposed for sale together in the London fruit shops, the American are preferred at double the price of the English."

The cultivation of the *grape* is also a pursuit which, it is probable, will hereafter become extensively engaged in throughout our country. It is already successfully raised both for wine and for the table. A committee, appointed by the Cincinnati Horticultural Society, in 1844, to report on the subject, examined thirty-nine different specimens of wines produced in that neighborhood, and came to the following conclusion: (The full report is contained in appendix No. 16.) "The result of the examination is a conviction, on the part of the committee, that our soil and climate are well adapted to the production of a very fine, delicious wine; and that the Catawba grape is the species which yields the finest qualities. It will be seen that the greatest number and variety of the specimens examined were from the several vineyards of N. Longworth, esq., who has been longest engaged in the cultivation of the vines, and in the manufacture of wine. Mr. Mottier and Jacob Resor, esquires, who have lately acquired a good reputation in this department of horticulture, were next to Mr. Longworth, in the number and variety of the specimens furnished. These, with the single specimens of Dr. Flagg and the specimens of Dr. Smith, confirm the opinions of the committee, that the pure juice of the grape, when judiciously managed, will furnish the finest kind of wine, without any addition or mixture whatever; that no saccharine addition is necessary to give it sufficient body to keep any length of time in this climate. In confirmation of this opinion, we would state that two of our German friends who were present informed us that they had taken, on different occasions, specimens of the wine of this country to Germany, and submitted them to the judgment of various connoisseurs in that country, by whom they were highly approved; the principal or only objection being, that they were too strong to compare with the fine kinds of the lightest German wines. A taste for the wines of this region appears to be well established, since all that can be produced finds a ready market at good prices; and the committee are of opinion that the period is not distant when the wines of Ohio will enjoy a celebrity equal to those of the Rhine."

A letter to the Horticultural Society of that city, also found in the above mentioned appendix, from William Resor, gives an account of a vintage there, by which it appears that his net profit was $2,525 50. The letters of Messrs. Longworth, Locke, Weller, Brown, &c., also in the same appendix, deserve perusal.

The Louisville Times thus mentions the "*Vintage from the Catawba grape.* We understand that the vintage of this delightful wine now in process in our neighborhood, in Indiana, will yield this season nearly 3,000 gallons. The vineyards, although in their infancy, would have produced double that quantity but for the wet weather. As it is, this is the happy experiment on 16 or 17 acres of land. Several of our most experienced citizens have commenced graperies which are now in a highly prosperous condition. We learn that Mr. Longworth, of Cincinnati, has a vineyard of 90 acres, promising to yield near 20,000 gallons."

In other public journals we find the following: "We are gratified to learn that a wealthy German, from the banks of the Rhine, Mr. John Klinger, has purchased a plantation of 450 acres on the Alleghany river, near Kittaning, for the cultivation of the grape. He is sanguine in the belief that the foreign species of this delightful fruit will flourish there, and we have great confidence that all that is wanting is proper and intelligent culture."—*Philadelphia North American.*

Again: The Burlington (Iowa) Hawkeye says, "that a gentleman from the south has just purchased 60 acres of land near that town, on which he intends to raise grapes and fruit of the best quality on a large scale."

A variety of grape called the Winnie grape is described in the Boston Cultivator, which appears to be similar and yet somewhat different from the Isabella grape. The writer says: "Some weeks ago we examined a Winnie grape-vine on the farm of Wm. B. Kingsbury, of Roxbury, which was grafted on a wild vine in the edge of the bushes, and it ran over a high rock; and though grafted but a few years ago, it has produced a noble crop of fruit this season. We were treated with some noble bunches, and found the fruit excellent. Some have supposed that this fruit was identical with the Isabella, as it resembles it in appearance and quality, in hardness, vigor, and luxuriance of the vine, its great productiveness, its time of ripening, &c. But we find, by close examination, that the two are different. The Winnie has not quite so large bunches, but the berries are larger, and a less number of small ones. The berries of the Winnie are round, while those of the Isabella are almost invariably of an oval shape, and considerably elongated at the stem. We find that the Winnie and Isabella grapes, as well as other varieties, differ in different soils, locations, and climates, and we are not prepared to draw a comparison between the merits of the two. Some who have cultivated the two think that the Winnie is a little the earliest, less acid, and less of the foxy taste, and that it is, on the whole, the most valuable. We are inclined to favor this opinion, but we give it with the caution that it is best to try it in a small way for experiment. We have some vines of the Winnie which we find remarkably hardy and vigorous, but they have not yet fruited, and we have seen it only in a few cases."

Though it is a matter of doubt with many whether the cultivation of the grape for wine extensively in this country will be useful, yet all will unquestionably agree that, as *table fruit*, the more universal use of the grape among us is most desirable; nor do we see why the preparation of them for market as *raisins* may not yet be an important business in sections of our country, so that we shall not be obliged to depend upon Spain for this species of dried fruit, and may have a great abundance of delicious grapes for eating, which are both a luxury and highly salutary to the health of all classes.

Considerable was said in the last report relative to the culture of *mustard*

by Mr. Parmalee, of Ohio. We have added in the appendix (No. 17) some further accounts relating to this subject, and would also here refer to Mr. Parmalee's letters to Mr. Ellsworth, late Commissioner of Patents, and which are contained in appendix No. 1, of papers furnished by Mr. Ellsworth, as mentioned in his letter to this office. There seems to be some contradictory statements in the various articles, respecting which we offer no opinion, but present the different articles which contain the information as the fairest course for us to pursue in such a case. This office is under obligation both to Mr. Parmalee and to Messrs. Fell & Brothers, as well as the different editors of the agricultural journals, from which our extracts are quoted, for their readiness to afford such information as is in their power. There can be no doubt, we think, that the culture of mustard may be carried on profitably in our country. The editor of the New York Farmer speaks, in his No. for May last, of a visit to a mustard factory in New York city, and says he was there informed that most of the mustard in this country is imported from Holland and Germany. 10,000 lbs. were received from the Sandwich islands. The price varies from seven to nine cents per pound for the brown, and five to seven for the white. American seed is less plump, but retains its strength longer.

The Ohio Cultivator mentions 70 acres in that State devoted to this culture, yielding 700 bushels of seed. Messrs. Fell & Brothers, of Philadelphia, in their statement mention 760 bushels, or 39,109 pounds, for which they paid $2,669 78.

In one of the agricultural journals, we meet with the following recommendation of kiln-drying mustard: "Col. Clark, in a conversation during a meeting of the New York Farmers' Club, recommends kiln-drying mustard, in order to keep it. It may be put into a kiln or oven heated to about 140° of Fahrenheit's thermometer, and dried, and afterwards kept from light and air, and it will thus retain its pungency a long time, and be much better than it generally is. Mustard has been recommended as a profitable crop, but it is apt to shatter out and become a weed; or, in other words, 'a plant out of place.' This might be obviated by keeping a field devoted to it and sowed every year; or, if sown sufficiently thick, by being shattered out in the fall it might be manured, and, when large enough, thinned out, and thus kept as a constant crop."

In the Journal of the Royal Agricultural Society of England, vols. 4 and 5, we find some account, by George Jesty, of the culture of mustard for fodder, or preparation for crops, which seems to prove its value for these purposes. He says that it is good both for cattle and sheep. The white species is that which he employs, as it is not liable to remain in the land after it has been once ploughed up, as the black will. A Mr. Hale, who was induced, by Mr. Jesty's success, to try it, says he sowed his on light, thin surface soil, subsoil white chalk, which had previously been cropped consecutively, as the two last crops, with wheat and oats. He states that he made a clean fallow with thrice ploughing, &c., and, *without* manure, sowed broadcast sixteen pounds of mustard on the 22d of July; and, "on the 2d of September, six weeks from the day of sowing, (scarcely a drop of rain during the whole period,) folded it off with about 300 ewes. On commencing the fold, the ewes did not appear to relish it; but on the following morning every stalk was eaten bare to the ground; and, even after, it was consumed as quickly and eagerly as any other green crop." He next tried it in comparison with rape, to be fed off by sheep, and as a preparation

for wheat. The experiment was in favor of the mustard, as the produce was considerably more than the rape; giving more nutritious food, and full three weeks earlier in its growth.

Mustard is also cultivated for its oil. The amount produced, according to Veit, is 12½ pounds for a bushel, or 30 pounds for 100 pounds of seed.

A better oil plant, however, and one which may be worthy the attention of our agriculturists, is the *colza*, of which there are two varieties, the summer and winter. An account of this plant, together with a treatise on the method of culture, translated from the French by J. W. P. Lewis, of Boston, will be found among the papers furnished by Mr. Ellsworth, and referred to by him in his letter to the Commissioner of Patents, appendix No. 1. Mr. Lewis also received from France some of the seed, which has been distributed from this office, and it is hoped that many a successful trial will yet be made to introduce it into this country's list of products. The oil is said to be so fine that it is used in the French light-houses, as well as for various other purposes. In Thaer's Principles of Agriculture, (now publishing in the Farmers' Library and Monthly Journal,) will be found a full account of the modes of culture, &c., as practised in Belgium, taken from Schwertz's Belgian Husbandry.

Another *oil* plant which is highly recommended is the *madia sativa*, a native of Chili, from which it is said an oil may be extracted superior to the olive oil. Mr. Boussingault gives the following statement of an experiment made by himself in cultivating the *madia sativa*, intermixed with carrots, in a fertile soil, well manured with farm dung. He says that it was an excellent crop. It took 127 days to come to maturity. The amount was—Seed, 2,424 pounds, husks deducted; dried leaves employed as litter, 7,700; carrots, without their leaves, 31,966. The seed gave—of oil 635.8; of cake, 17067.6. 100 of seed gave, of oil 26.24; cake, 70.72; loss, 33.4; total, 100. He says that this agrees with results published by others, but the seed which in the press gave 26.24 of oil per cent., actually yielded 41 per cent., by analysis, in the laboratory. In the Journal des Connaissances Usuelles et Pratiques, vol. 29, we find an article on the *madia sativa*, and its culture, &c., which has been translated and subjoined in an appendix to this report, No 18.

The *camelina sativa*, or *myagrum sativa*—gold of pleasure—(Leindotter of the Germans,) is likewise recommended for culture as an oil plant in some of the English agricultural journals. A writer in the Mark Lane Express, who tried it, says that he drilled in his seed on the 24th of March, in rows, nine inches from row to row. The soil was a strong loam or clay, prepared after beans. It grew most luxuriantly until the end of May, when he fed down three acres by sheep, leaving another three for seed. The sheep ate it most voraciously after it had been fed down; and, to his surprise, the plant shot up again, and produced a fine crop of seed. If the weather had been good, the harvest would have been three weeks earlier than it was in the latter part of July. He cut it with a sickle, the same as wheat, bound it in sheaves, put it up in rows till dry, then threshed it out. The quantity of seed from the three acres yielded 72 bushels, of 56 to 60 pounds weight each. The other three acres were not harvested at the date of his letter, (August 21,) but he expected a fine yield; and, after the crop, to prepare the land for wheat, as he felt convinced that it does not impoverish the land like most other crops. The straw, likewise, he mentions may be used by cutting it up into chaff, and thus an excellent food is produced of a

very nutritious nature, as the stalks abound in a gelatinous substance as well as the chaff; or, burnt into ashes, it makes manure; or, being small and durable, they make good thatching." He concludes by saying that there are so many valuable properties about it, it will prove unrivalled; the oil, the oil cake, (of a most nutritious nature,) the plenty of green herbage for sheep, all recommend it most highly. The oil cake he tried upon bullocks, sheep, and calves, and they liked it so much that he determined to have no other. He says that it is a fine herbaceous tonic; combined with mucilage, gluten, and gum, where the linseed is not.

In Lawson's Agricultural Manual, he says: "The gold of pleasure produces a finer oil for burning than the rape or mustard, having a brighter flame, less smoke, and scarcely any smell. It succeeds better than any of the other cruciferous oil-plants on light shallow dry soils, and arrives so soon at maturity that in the south of Europe it produces two crops in a season. In several of the more northerly districts of the continent, as the north of France, Germany, and Holland, although it will not produce two crops in the season, it is found very useful for sowing in June, or beginning of July, where other crops have failed; and when sown in the early part of the season, it may be removed, to be succeeded by turnips, grass, seeds, &c. Besides the use of its seed for oil, the stem yields a coarse fibre for making sack, sail-cloth, &c., and, being small, hard, and durable, are used for thatching temporary erections, and also for making coarse packing paper. A superior variety has lately been introduced into France, under the name of *la cameline majeur*, and which differs from the common in being of stronger growth, producing more seed pods, which contain a greater number of larger and more oily seeds. One circumstance deserving of attention is, that it is never found to be at all injured by insects." Boussingault gives the productiveness of the gold of pleasure, of oil 27 per cent., and of cake 72 per cent.

Thaer, in his Principles of Agriculture, also speaks of it thus: "This plant grows wild, and is sometimes very troublesome among flax. It grows to the height of one or two feet; the stem is angular, hairy, and branching; the leaves are lanceolate, and embrace the stem at their basis; the flowers are yellow, and grow in clusters at the top of the stem. The plants delight in sandy soils, provided they are rich; and it is on such soils that it is cultivated, but it exhausts them in a great degree. It is sown in April, and gathered about the end of July or beginning of August. It is less subject than other oil plants to the ravages of insects, and seldom fails entirely. Its produce scarcely exceeds five bushels per acre. [This is an evident mistake of the translator.] A bushel ought to yield from twenty to twenty-four lbs. of oil." Another author says that it has the peculiar advantage of ripening its seeds in the short space of three months from the time of sowing, and thus is sown in spring, when winter colza or rape has perished in the winter. The amount sown is said to be less than two pounds to an acre, mixed with sand to distribute it more equally; then it is harrowed by a bush harrow, and as it will grow on very poor land, it needs no more manure than was left by the last crop. With the stems brooms are made, and in some places it is cultivated for this purpose. Veit says that it is less injured than any of the other oil plants by frost, drought, or wet weather. In seed he states that it yields two to three schäffel (a schäffel, Bavarian, is nearly 6¼ English bushels) per morgen—about 0.842 of an English acre. He says that it yields 28 pounds of oil and 66 pounds of oil-cake out of 100

pounds. Professor Burger, also, of Vienna, gives a similar account of the gold of pleasure, which we here translate. He says: "The gold of pleasure (*myagrum sativum*) deserves the highest regard for a loose sandy soil, deficient in *humus*, and in which the other oil plants do not thrive, because it does not suffer on account of dryness, is not attacked by insects, and yields, in the given circumstances, a fair crop. This plant has been planted often in lower Carinthia, along the Drave, in bad sandy fields, filled with stones, but it is rarely found in deep loamy and fruitful soils, although there greater harvest may be expected. I think, after numerous observations made for many years, in different localities, on the success of the plant, that it particularly agrees with a not too loose sand soil in a warm and dry climate. A field which has been manured during former years is most suitable to it. It may be sowed at any time during the spring, since it is not much injured by dryness, and is of rapid growth. It is also suited for a late sowing, although the earlier is always most preferable; from March to the middle of May is the proper time with us, (Austria.) It must be harrowed and hoed. On an average it yields 12, and in the most favorable circumstances 18 metzen for a yoke, or 20 to 30 bushels for about 1½ acres. A metzen of seed weighs from 75 to 81 lbs., and yields 18 to 24 lbs. of oil."

The cultivation of the *castor bean*, also, for its oil, is gaining ground among us, and promises to reward the industry of those who turn their attention to it. The American Farmer for May 14, 1845, contains an account, taken from the Southern Whig, of an experiment to this effect made in Georgia by Mr. Joshua Willis, of Troup county, which we here subjoin: "During the past year he manufactured about 1,500 gallons of oil, which was mostly, we believe, purchased by the druggists and physicians of Columbus and the circumjacent country. We were favored with a specimen of the article referred to, and cannot but regard it as a fair and beautiful oil—almost destitute of color or smell, and as little of the unpleasant flavor peculiar to the castor oil bean as is consistent with an unadulterated preparation. Clear, bland, free from rancidity, and without any foreign admixture, it constitutes an admirable article for domestic use, and, in our hands, manifested mildly but effectually its cathartic property. The East Indies have heretofore furnished probably seven-eighths of all the oil consumed in England; but for the last several years American oil, derived chiefly from the British colonies and the western States, has been exported to that country to the amount perhaps of from fifty to eighty thousand pounds annually. The latter article, though confessedly of fine quality, and possessing a flavor superior to the East India oil, has yet been regarded as objectionable on account of the deposite (in cold weather) of a white flaky matter, which some have supposed to be *margaratine*—a fatty salt, consisting of the two proximate constituents, *margaratic acid* and *glycerine*. Others have supposed it to be the result of adulteration from olive oil, which is known, at low temperatures, to deposite what Pelouze and Soudet regard the *margarite* and *oleate of glycerite*, (the hydrated oxide of glycerine;) an unlikely supposition, however, in our estimation, as most of the latter oil is imported into this country from the south of Europe, and at too high a price to warrant the fraud of admixture with the castor oil designed for exportation. We are rather inclined to the belief that such deposite, so frequently found in the American article, is from the liberal mixture of animal oil, (*Adeps suillus*,) which does not sustain its fluidity under from 78.5

deg. to 87.5 deg. This may perhaps account for the rancid and acrid nature of some of the castor oil of commerce, as the olein of the lard readily becomes rancid; *i. e.* acquires a disagreeable odor and acid properties by exposure to the oxygen of the atmosphere. Indeed, the deposite of *margaratine* from castor oil, if any, should be exceedingly small, as not more than 0.002 of the entire products of saponification consist of margaritic acid. The oil manufactured by Mr. Willis, we believe, fully sustains the truth of this last remark, and, as a specimen of southern enterprise, alike honorable to his skill and industry, and commends itself to the public confidence and popular use. Mr. W. will be prepared to execute large orders this fall and winter, and assures us that it shall not cost, to druggists or other purchasers whom he may supply, more than the best article does from any other quarter; and all he asks is, that, other things being equal, home manufacture may have the preference."

Again: The following calculation may aid those who wish for further information respecting this product: "*Castor beans.*—A friend, who has statistical information with respect to the production of the castor bean, and the manufacture of the oil, handed us, a few days since, the following calculation, which we cheerfully publish, trusting that the farmers of our vicinity will look to the enterprise and test its efficiency: Say 40 farmers plant 20 acres each; 800 acres, at 35 bushels per acre, would yield 28,000 bushels; 28,000 bushels, at 50 cents per bushel, would amount to $14,000; 1,225 barrels cost $1 each, $1,225; freight to New York, at $1 50 per barrel, $1,838. Charges for insurance, &c, &c., $1 per barrel, $1,225. Two hands to make oil, say $512. Total of expenses, $18,800. 28,000 bushels of beans will yield $1\frac{3}{4}$ gallons oil per bushel; 49,000 gallons in all—at 60 cents per gallon, $29,400. Deduct expenses, $18,800, and the 40 farmers, with 20 acres each, would realize the handsome profit of $10,600. This may be considered figure work, and an easy way to speculate on paper; but we hope the experiment will be tried by our enterprising neighbors."—*Lexington (Missouri) Express.*

The castor oil bean, it is said, will yield 60 per cent. of oil, which is a larger proportion than most of the oil plants.

A plant called the *bene* plant (*Sesamum orientale*) is also highly recommended, on account of the large quantity of oil which it contains. It is derived from the West India islands, where it was introduced from Africa, and is somewhat known in the southern States. The letter of Mr. Merriam to this office contains a description of it.—(See appendix No. 19.) It is said, likewise, to be possessed of valuable medical virtues. It seems, from Mr. Merriam's account, that the oil is light colored and flavorless; but it contains too much mucilage to make soap. In the Farmers' Cyclopedia we find an account of this plant, in which it is stated that the oil pressed from its seeds will keep many years without acquiring any rancid taste; but in two years becomes quite mild, and can be used for sallads, &c. Nine pounds of the seed are said to yield upwards of two pounds of fine oil.

"It is described to be an annual plant, growing like cotton, three to six feet high, with numerous square pods, about $1\frac{1}{2}$ inch long, filled with seeds about the size of flax seeds. The product is about 12 or 15 bushels per acre, and the proportion of oil yielded to the pressure has been estimated as equal to half the measure of the seed;" and by some in still greater proportion. It is sown in April, and gathered in September.

A plant of the cabbage or colewort species—also used, indeed, as a vegeta-

ble—is the *broccoli*, which we mention here for the purpose of directing those who may feel interested to learn respecting its culture to the paper prepared by Dr. Junius Smith—the same gentleman to whom the office was indebted, in the report of the preceding year, for his valuable remarks on the cultivation of celery. His modes are based on actual experiments, and are entitled to attention from his long acquaintance, by his residence in England, with the best methods adopted there for raising many of the garden vegetables. (See appendix No. 20.)

The *coloring* plants are also worthy of notice—especially *madder* and *indigo.* Each of these topics were adverted to in the last report. Since then, we have observed some articles published in the agricultural papers, which appear to furnish some additional valuable information; and we therefore have placed them in an appendix, No. 21. The communications of Messrs. Winifree, Partridge, and Spalding, in the American Agriculturist for November, 1845, and February, 1846, are full of interesting particulars respecting the preparation and culture of indigo. That it affords a favorable object towards which the enterprise of a portion of the south might be advantageously turned, scarcely admits of a doubt. The great object seems to be, to recover the lost method of preparing the article for market.

Mr. Boussingault states, that in Venezuela those soils were preferred for indigo which are light, and susceptible of irrigation—a condition which he pronounces all but indispensable to profitable cultivation between the tropics. Indigo, he says, "requires a warm climate, at an elevation of about 3,250 feet above the level of the sea; where the mean temperature is not more than from 72° to 75° Fahrenheit, the indigo husbandry cannot be carried on to advantage." "In the valley d'Aragua, where the best plantations are met with, the plant is sowed in lines—the holes destined to receive the seed being about 1¾ inch in depth, and somewhat more than 25 inches apart. A pinch of seed is dropped into each hole, and is covered with a little earth. The sowing takes place in soils that are moist but well drained, or in situations generally which have no system of irrigation at the period of the first rains. The seeds shoot in the course of the first week; hoeing is performed in the course of the month. The first cutting takes place when the plant is coming into flower; from 50 to 60 days generally intervene from the sowing to this cutting; but the time necessary for the development of the leaves depends, of course, upon the climate." Near Maracaibo, where the mean temperature is about 78° Fahr., the gathering does not take place before the third month. The second cutting is performed from 45 to 50 days after the first, and in this way several successive crops are obtained, until it is seen that the plant begins to degenerate. In good soils the indigo will last for two years; in soils of an inferior quality, the crop is generally annual.

"The indigo harvest is immediately transported to tanks, or large rectangular reservoirs, built of masonry and disposed on different levels, the superior or steeping tank being much larger than the two others. Some in the valley d'Aragua," he says, "are upwards of 20 feet long by 15 wide, and 20 inches deep. The second or mashing tank is narrower and deeper than the former. The third, or depositing tank, receives the liquor from the mashing tank, and there the indigo subsides. Some do not use the third tank, but have the deposite take place in the mashing tank. The leaves are thrown into the steeper, covered with water, and kept down by planks loaded

with stones; fermentation soon begins, and is allowed to continue for about 18 hours."

"It is in the management of this first operation," says M. Boussingault, "lies much of the art of the indigo maker. If it is too long continued, some part of the coloring matter is destroyed, and by stopping it too soon the indigo is left in the leaves. When the fermentation is judged to have gone on long enough, the liquor is run off into the battery and vigorously stirred until the *grain* is deposited. The fluid is then either let into the subsider or left in the battery, and the deposite is complete at the end of about 20 hours; the fluid floating above is drawn off, and the indigo paste is scooped out and placed on cloths to drain. When firm enough it is divided up into lumps, and these are set in the shade to dry. The product in the valley d'Aragua is, in good soil and with care, 280 pounds per hectare, or about 112 pounds per English acre. In Carolina it is not as productive, &c. In the East Indies, on the Coromandel coast, the growth of indigo takes place on sandy soils which are not irrigated, and in which vegetation is only possible during the rainy season. Immediately after rains have set in, in December, the land is ploughed twice superficially, the indigo is sown broadcast, and the seed harrowed in by dragging a fagot of bamboos over the surface, or treading it in by a flock of sheep. The first and principal gathering is in March. Any other crop is purely casual, and depends wholly on the rain that falls. The drought, so frequent on the coast, affects it. The harvest takes place after the flowering season. The crop is dried in the sun; the plant is then beaten with switches, and thus the leaves are detached from the stems; after which, to make them perfectly dry, they are again placed in the sun; when they are reduced to coarse powder, and hauled over to the indigo manufacturer."

"On the coast of Coromandel," says M. Boussingault, "the indigo is always extracted from the dried leaves; which, bruised and broken, are steeped in three or four times their bulk of cold water for two or three hours. The indigo is then filtered through a loose stuff made of goat's hair; the filtered liquor is beaten for two hours; then five gallons of lime-water are added for 100 pounds of dried leaves; the mixture is stirred, and left to settle. When the deposite is formed, the water on the top is drawn off; the sediment is washed in a little boiling water and thrown on a cloth, dried and drained. Then it is pressed and cut into lumps, and thoroughly dried in the air. In this process there is no fermentation. This indigo is not much esteemed in commerce; it is heavy, of a pale blue, rough when broken, &c."

In the Polytechnisches Archiv for 1841, mention is made of experiments to produce indigo from the Polygonum tinctorium. The Societe d'Encouragement, &c., in France, offered a premium in reference to this object, and some indigo of a fair quality was produced. The per centum of indigo in the plant, however, is so small that there seems little reason to expect any productive results from its manufacture from that plant. Boussingault, in his Rural Economy, says: "This plant is a native of China, and was brought to France and propagated under the care of M. De Lille. In the course of three months it has thrown out all its leaves, and in the south of France it never fails to ripen in the seed. From some experiments that have been made, the leaves of the polygonum appear to contain about the five thousandth of their weight of indigo; and as the acre of land will yield between 11,000 and 11,900 pounds weight of leaves, the produce of the coloring matter will come to upwards of 56½ pounds." M. de Vilmorin

proposes to reduce the colored and insoluble indigo to the colorless and insoluble state, by means of a salt of the protoxide of iron in contact with an alkali, and subsequently to restore its color and effect its precipitation by contact with the oxygen of the air. M. Boussingault says that this would undoubtedly be a great improvement. As we are speaking of dye plants, we may here say, that it is stated in an English journal that the outer case of the *balsam* affords a beautiful orange dye, and it is suggested that the cultivation of this plant may be an object worthy of attention.

One of the agricultural journals thus speaks of the subject of indigo and madder as articles of culture, which deserve notice, in view of the over-production of cotton in the southern States. The suggestions are valuable, and there can be but little doubt that either of the products may be so cultivated as to prove a remunerating one: "Among the *new* articles of product which we have seen recommended to the adoption of the southern planters by the southern press are those of indigo and madder, both articles of vital importance to the manufacturing interest, and each offering in itself, to a very large extent, an encouraging reward for a large amount of labor now but indifferently paid for. Of *madder*, there are consumed in dyeing at least a million of dollars a year, and we should presume that the value of *indigo* used in the same way would amount to an equal sum; so that, if these estimates be placed upon proper data, these two articles alone will enable southern planters to substitute the culture of them to that extent for cotton; and thus, by diverting so much of their soil and force from the production of cotton, they may effectuate a threefold good: First, decrease the product of cotton to the standard of demand; second, re-establish an equitable value for it; and, third, procure a just reward, in the price of indigo and madder, for the surplus labor of their plantations."

In the New York Farmer and Mechanic for March some mention is made of a discussion on the subject of madder in the New York Farmers' Club, in which it is stated that, as near as can be ascertained, the last year's importation (for 1844) was about $1,800,000. The British import of madder in 1839 was about 20,000,000 pounds; in 1841, 27,000,000; in 1842, 20,000,000. British duty 2 shillings a hundred pounds on ground madder, and sixpence on raw madder. The price varies from 14 to 17 cents per pound. It is further said that, as it must be mowed to give growth to the roots, the leaves will make a fodder nearly equal to lucerne. The extract of madder is called *garancine*. It is stated that in the calico printing works in our country there are printed weekly 166,000 pieces, or 8,632,000 pieces per year, (the average price 6 to 8 cents per yard;) which gives, at $2 per piece, $17,264,000. Were all these establishments working to their full ability in what are termed *fast-color prints*, each piece of which needs from 1 to 3 pounds of madder, it would reach to 5 or 6 thousand tons weight—in value over $2,000,000. But as fast colors are not used in half, estimating them at 75,000 pieces, requiring 1½ pound each on an average, there will be consumed nearly 6,000,000 pounds a year—amounting, at 17 cents, to $1,000,000; to say nothing of its use in dyeing, or for various other purposes. No substitute has yet been discovered for permanently fixing the colors, so that madder must be considered essential to the calico printer. It will be seen, therefore, that there is much encouragement for its culture to supply our own market; and as the British duty is only about one-half farthing per pound, it may be profitably exported.

It is stated in the American Agriculturist that during the year 1845

10,000 bags, equivalent to 700 tons of *sumach*, nearly one-twentieth of the home consumption, have been sent from the south, principally from Virginia. The writer says that such as can be raised in South Carolina, Georgia, Alabama, and more particularly Florida, would be of better quality. It should be gathered as soon as ripe, and planted soon, so as not to become too old. This is said to be an important fact for southern planters; for by planting the seed, and mowing down the shoots three times annually, they might obtain from 3 to 5 tons per acre, with much less expense and trouble than by gathering and bringing home the natural growth, scattered extensively over the country. The sumach is perennial, and when once planted would last for ages; the crop, when sown, annually increasing, until the ground becomes full of roots. In the same journal for September, 1843, may be found an article on the cultivation of sumach, with the time for cutting, and modes of preparing for the market.

While speaking of products the culture of which may be tried in our country, it may not be unworthy of notice to allude to the following statement, which we find in the London Gardeners' Chronicle for November 1, 1845: "The French, in despair of getting genuine attar of roses, which is always excessively adulterated, have taken to searching for a substitute, and seem to have found one in *Pelargonium capitatum*. We learn that M. Demarosn has tried the experiment of cultivating this plant in the open air, in a loamy soil. He planted 100 rods with 5,000 cuttings; they grew fast, and in October he gathered the crop, which amounted to from 4 to 8 pounds of leaves and stems each plant. When distilled, the product of essential oil was much larger than could be obtained from roses, and the water was found excellent for perfumery. The quality of the articles prepared from this essence was considered by the best judges to be far superior to that of roses in their present state of adulteration. In short, the experiment was so successful and profitable that it is about to be repeated on a large scale."

In the last report mention was made of *spurry* as a product which might be useful in this country. In the Journal des Connaissances Usuelles et Pratiques, volume 29, we find a notice of a giant spurry, a translation of which we subjoin in an appendix, No. 22.

The subject of *artichokes* was also noticed in the last report; and we may here add a statement which was published in the American Farmer for November, 1845, from Mr. S. Weller, of Brinkleyville, North Carolina. He is speaking of the field culture, and he says: "To the use for stock generally, and swine in particular, I invite the attention of planters. I selected a spot of very moderate fertility, which some would call poor land; and after running furrows about 3 feet apart, I put in the drills, ere planting, a few old cornstalks by way of manure, then dropped bits of artichoke about 10 inches apart, and covered them with the plough. The after culture was very little, as that of scarifying the ground with the harrow and cultivator 2 or 3 times, and giving very little hoe work. They grew very luxuriantly; and in the beginning of winter the furrows, where the plants were, were opened, and the artichokes gathered, are all appearing in the drills. I filled several empty flour barrels, and those thus saved kept perfectly sound, in a cellar, till spring, when some were planted, and the rest fed to swine; and in the ground where the first patch was planted, early last spring, the young plants came up as thick almost as they could stand. All but the few in the drills were dug up and fed to my hogs. Having seen accounts in the Cultivator of one gentleman in Alabama, and another in Massachusetts,

who each made about 700 bushels to the acre, I was desirous to ascertain the yield of mine as near as I could, and made out 20 bushels on the twentieth of an acre, or that the yield of my poor ground was not much more than half of the two named north and south. But I was so much encouraged by the result, that I planted nearly two acres last spring, in lots where I can keep my swine in the winter. I have just given these their last working, and they all look very promising. The severe dry spell here has affected them less, I believe, than any other field culture vegetable. There are some striking advantages in artichoke culture. One is, their great and sure yield, compared with that of most other plants. For instance, I consider their produce ten times greater than that of corn, and with far less labor in the culture. Again: they keep perfectly sound in the winter in almost any situation, either gathered or left in the ground. If the latter, hogs can help themselves at any period after the crop is matured, till they are again cultivated. The tops (an abundant yield of them too) are good for stock, (green or cured,) or they are valuable to put in the drills for a succeeding crop, and tend to thus improve the soil where cultivated—on the principle that the litter or tops of any vegetable is the best help in the way of manure for that vegetable, as cornstalks put in drills is the best litter for corn, as I have found from several years' experience. Where the artichoke tops were in the drills this year, I find the most. I have lately learned that a gentleman in Nash county brought a very superior kind of artichoke from Tennessee, and that the yield and growth are truly astonishing; and that so anxious are his neighbors to avail themselves of its advantages that they gave him $2 a bushel for seed. I have been told, from the same source of information, that the Nash farmer has a field of 20 acres now in culture, and that the tops are higher than a man's head. If so, they are rather higher than mine are now. I shall certainly, if I live, try and procure a bushel for seed of said kind, if for no other reason than to compare with my indigenous variety; and if found superior, or answerable to the stirring description of the Tennessee kind, I shall communicate the fact for your useful print in due time."

Such facts as these, taken in connexion with such as have been mentioned in former reports, seem sufficiently conclusive as to its utility as a product for cultivation.

The cultivation of *arrow-root* seems to promise success in Georgia. A notice to this effect appears in one of the public journals. "*Georgia arrow root.*—We have received from Col. Hallowes, of Camden county, a very superior specimen of arrow-root, of his own manufacture. Col. H., we are pleased to learn, is extensively engaged in the culture and manufacture of this article. His preparations for separating the powder and drying it are extensive and costly. He has been entirely successful, and now offers for sale between 4,000 and 5,000 lbs. as the result of his last year's operations. Col. H. warrants it not only to be entirely free from all impurities, but also to be decidedly superior to the imported article."—*Savannah Republican.*

In appendix No. 23 will be found an interesting statement of the profits of cultivating *locust-timber.*

As to the products of the *dairy,* which were noticed in former reports, we have gathered some interesting extracts from the agricultural journals, both of our own country and those of England, some of which we shall embody in these pages, and refer for others to the appendix No. 24, on these subjects.

The preparation of *butter* has become an object of greater interest to our farmers now than it was formerly—as much now depends on this to secure its introduction into the foreign market. In the Mark Lane Express we find an account of the English method of preparing butter for the London market, which may deserve the attention of those who have begun to export the products of their dairy to that country. "The following is the most approved method of making and preparing butter for the London market, and is submitted for the advantage of farmers and dairymen throughout Ireland. Butter made on this system, with care and quick despatch, will insure high prices and quick returns. * * * The best land is old pasture, as free from weeds as possible, with abundance of good water. The cows should not be heated or tormented in any way, housed at night, and fed on green food, and the pasture changed when practicable. In milking, take saltpetre in the pail, one eighth of an ounce to eight quarts of milk. The dairy should be perfectly clean; airy; of equal temperature, say 50°; very little light, and completely shaded from sun by trees or otherwise; and in winter a stove may be required. Strain the milk into coolers, sweet and dry, (never mix warm and cold milk,) keep it from two to four days, then put the whole of the milk and cream into a clean churn, which is not to be used for any purpose except during the time it is in operation. Boiling water to be added to raise the temperature to about 68°, or 60° if horse or water-power be used. The time occupied is from one to two hours, depending on the size of the churn; but churning should not be continued beyond the proper time. After churning, put the butter into two bowls or pans of pickle, made from pure water and fine stored salt, (as common gives the butter a bad flavor.) It should be well washed, and the pickle changed frequently, until all milk is extracted. working with the hand the two pieces alternately until the grain becomes quite close and firm, when it is to be cured with the finest dry stored salt and sugar. The proportion to be one ounce of refined sugar to one pound of salt, to be well worked into the butter with the hand; but the quantity of curing materials will depend on the time and labor given by the dairy woman in working and beating the butter, (after the salt and sugar are applied,) which should continue until all pickle is driven out. The butter should be finished the day it is churned, and then be pressed as closely as possible into the cask. The cask should be well seasoned for some days previous, with strong pickle, frequently changed, or hot pickle, and must be strong and air-tight; the size is of no consequence if filled and sent off in one week. If not filled at one churning, the butter is to be covered with pickle until the next; but no cask to contain more than one week's butter. If butter should at any time appear pale in color after churning has commenced, a little grated carrot juice may be put into the milk, and will not injure either milk or butter. All butter should be at the place of shipping one day prior to the steamer leaving, so as to run no risk of going forward to the agents."

The Ohio Cultivator gives a communication which furnishes the Russian mode of making butter, as follows: "*Russian mode of making butter.*—I have for several years had the entire care of the milk department in my father's family. I therefore read with great interest whatever related to making butter and cheese, and I found much that was different from what I had been in the habit of practising. One case of this kind was directions for making butter in winter, according to what is called the Russian

method, by which it was said that butter could be made in winter as sweet, and with as little churning, as in summer. So I set about trying the experiment, and the result exceeded my expectations. My new practice is as follows: Before I go out to milk, I put a kettle, say one-third full of water, and large enough to let the milk-pail into it, on the stove, where it will get boiling hot by the time I have come in with the milk. I then strain the milk into another vessel, and wash the pail, which should always be of tin; then pour the milk back into the pail, and set it into the kettle of boiling water till the milk becomes scalding hot, taking care not to let it boil; then pour it into crocks or pans, and set it in the cellar for the cream to rise, in the usual way. As little time should be occupied in this heating process as possible; hence the advantage of having the water ready hot when the milk is brought in. Cream procured in this way will seldom require more than twenty minutes' churning, while, by the common practice, the poor dairy maid may have to churn for hours, and then perhaps have to throw it away, as I did myself on two occasions, before I happened to gain this valuable piece of information."

A mode of making butter by means of an atmospheric churn has been recently stated to have been invented in Ireland by the Bishop of Kildare. The results are said to have been in the highest degree satisfactory. The results of the process are ascribed to the oxygen of the air. It will be seen, however, from the subjoined extracts from the proceedings of the Farmers' Club, in New York, that something similar is affirmed to have been discovered in this country. A mode of working butter, which is said to answer well, will also be found in appendix No. 24.

"*New York, December* 10, 1845.—Sir: Three years ago last summer, I was trying a new method of cooling milk, being in the great milk business carried on on the Erie railroad. To cool the milk, I used an air pump to draw air through a reservoir full of ice, and force it into a receiver under a pressure of 50 lbs. to the square inch. Thus compressed, the air remained, the receiver being surrounded by ice to keep it cool. To this receiver a small pipe was attached, one end of which could readily be inserted in a can of milk, and the cold compressed air could thus, by means of a cock, be let at pleasure into the milk when we desired to cool it. The milk in these cans, in hot weather, being often very warm, and the air in the receiver having become warm for want of care, I found that the top of the milk was covered with butter, and raised cream in a few minutes. I saw that the churning was going on, and I had to stop my process. I mentioned this fact to the officers of the Institute at that time. I then proposed to patent it for butter making, for cooling, or, by my process, for steaming milk, (scalding it.)

THADDEUS SELLECK."

"*New mode of making butter.*—The Lord Bishop of Kildare states, that 30 years ago he had formed the idea of a butter churn on a new principle, but had not carried it into experiment until within a few weeks past. He states that his churn is made of tin, and this fits into another tin cylinder provided with a funnel and a stop-cock, so as to heat the cream to the proper temperature. He has a forcing pump, with a glass tube, through which he forces atmospheric air in full current through the cream at nearly the bottom of the churn. The pump is worked by a hand-winch. The experiments are as

follows: September 23—15 gallons and 2 quarts of cream, operated on for 2 hours and 10 minutes, gave 26 lbs. of delicious butter. September 26—10 gallons and 2 quarts gave, in 2 hours and 10 minutes, 23 lbs. of butter. September 30—12 gallons and 2 quarts of cream, in 2 hours and 10 minutes, gave 20½ lbs. of butter. October 3—10 gallons and 2 quarts, in 2 hours, gave 21½ lbs. of butter. October 14—10 gallons and 2 pints of cream, in 1 hour 45 minutes, gave 22 lbs. of butter. The next Friday 11 gallons of cream, in 2 hours, gave 26 lbs. of butter. The different results are ascribed to different temperatures and different qualities of cream used. The Bishop ascribes the results, by this process, to the intimate introduction of the oxygen of the air."

Cheese is another product of the dairy. The English ascribe the inferiority of the Dutch cheese to their own, in flavor and richness, to the Dutch method of soiling their cows always in the house; and assert that cut food does not answer as well for cows as natural pasturing. The subject is one of considerable interest, whether the theory just given be the true one or not.

We have also inserted in appendix No. 24 several valuable articles taken from various journals on the subject of cheese making, &c. Among these we may refer to the method of making Cheshire cheese—the mode adopted in cheese making by Mr. Fish, who gained the first premium of the New York State Agricultural Society for 1844—and the account of the Connecticut cheese dairies, &c., in the Cultivator, &c. We select a few of the notices which are frequent in the public journals, and which indicate the extent of the manufacture of butter and cheese in parts of our country.

"*Vermont butter again.*—A Vermont trader came to the city last week to sell his full supply of butter—90 tons! Pretty well for a single trader in a small town among the mountains."—*Boston Traveller.*

"*Cheese.*—The town of Collins, Erie county, New York, made 554,000 pounds of cheese during the last year. The town of Fairfield, Herkimer county, made 1,355,997 pounds during the same period. Herkimer county turns out, annually, 8,208,796 pounds of cheese. This, at eight cents per pound, (the present price of the article) would give the dairymen of old Herkimer $656,703 68."

As to our cheese abroad we find the following, taken from the English papers, by which it will be seen that the export has greatly increased within a few years—quadrupled within three years:

"*American cheese.*—On the motion of Sir P. Egerton, one of the members for the county of Cheshire, a return has been laid upon the table of the British House of Commons relative to the importation of foreign cheese, which exhibits the following figures:

		From Europe.	From America.	Total.
1841	-	254,995 cwt.	15,154 cwt.	270,149 cwt.
1842	-	165,614	14,098	179,712
1843	-	136,998	42,312	179,310
1844	-	160,654	53,115	213,769

"By this statement we find that the importation of American cheese has quadrupled during the last three years; and, during the last year, the importation amounted to 53,115 cwt. To our American friends we say, send nothing to this country but a good article; introduce more color into it;

and we are sure that, in another year, England will use four times the quantity of its previous consumption. We shall also be pleased to find that the manufacturer and exporter get a larger share of the prices for which it is sold in England. The writer of this has now upon his table an American cheese, equal to the celebrated 'STILTON,' for which 25 cents per pound is obtained; whilst this excellent '*American*' is sold for 13 cents only!!"—*English paper.*

With reference to the above, we may adopt the words of one of our own writers on this same subject: "Thus we are put in possession of the fact that excellent American cheese is sold at 13 cents per pound, (at which comparatively low price it will pay the shipper a profit,) which is in all respects 'equal' in quality to the 'celebrated Stilton,' which commands 25 cents per pound. The inference is very plain to us, that if the suggestions of the above writer are followed, this disparity in price between the two kinds will not continue long; and that, as American cheese becomes more extensively known in England, the demand for it will be increased, and consequently better prices for it will be obtained. Indeed, we believe the time is not far distant when England will be the great market for the product of our dairies."

Some other cheese statistics may likewise be interesting in this connexion.

"*Cheese statistics and speculations.*—We take from the Rochester Democrat the following statistics of one of the staple articles of the country, to which we add some remarks and facts of our own:

"'A new impetus seems to have been given to the cheese trade, and for a few weeks it has been in great demand for the eastern market. About six weeks since speculations in the article commenced in Boston; and a few days after, the bulk of the quantity in that city and New York was monopolized by a few dealers. The price going up east, a house in this city went into the market in this section of the State and bought up nearly all that could be found in this and the adjoining counties, and forwarded it to Boston. What was dull sale last fall (at the close of navigation) in the eastern cities, at four to five cents, is now in demand at seven to eight and a half cents—the rise being nearly 100 per cent.

"'The rapid increase of this important item of the dairy at the west is astonishing. Last year the aggregate value of the amount that passed through the canals and the Hudson river was over $1,500,000.

"'We gather the following interesting statistics in relation to it from the canal office at Albany. Arrived at the Hudson river—

1834	6,340,000 pounds.
1835	9,586,000
1836	14,060,000
1837	15,560,000
1838	13,810,000
1839	14,530,000
1840	18,820,000
1841	14,170,000
1842	19,004,000
1843	24,334,000
1844	26,677,500

"'The shipments to foreign nations have averaged, for the last ten years, about 3,000,000 pounds annually. This went to forty two countries. With-

in the two past years the market in England has been gradually gaining, and there was exported there in 1843, 2,253,416 pounds—1844, 5,000,000 pounds estimated.

"'The last accounts from Liverpool state that the American cheese was driving that from Ireland out of the market. The West Indies and Cuba are our next largest foreign markets. China, it is supposed, will also be our customer, large quantities having been sent there as an experiment.

"'During the past winter about 400,000 pounds have arrived at Albany by railroad. Of this amount, not far from 100,000 pounds were sent from this city.

"'We notice by the Cincinnati prices current that it is scarce in that city at seven and a quarter cents—the market having been mostly cleared by a New Orleans house for a foreign market.

"'At the port of Cincinnati, in the year 1844, there arrived the following amounts and value of cheese: Cheese in boxes, 74,073—2,590,000 pounds; cheese in casks, 2,968—509,400 pounds. Total, 3,099,400 pounds.

"'This was sold at an average of five cents per pound, making about $156,000 for the article of cheese; which, when we look at it on the table, appears to be a small matter. About five millions of pounds are also transported on the Pennsylvania and Ohio canal from the counties of Trumbull, Portage, Summit, &c., &c.

"'Cheese, then, is a very extensive article of trade; and it is a very important fact that the export of it to England doubled the last year. At the present prices the export of cheese to England amounts to $300,000. This is quite an item in our accounts.'"—*Cincinnati Chronicle.*

We may also add the following milk statistics of the amount of milk forwarded to New York over the New York and Erie railroad for 1844: January, 208,156 quarts; February, 206,656; March, 300,088; April, 434,546; May, 604,166; June, 646,896; July, 750,186; August, 651,188; September, 554,826; October, 497,772; November, 429,784; December, 326,132. Total, 5,611,016. The amounts of the first two months in 1845 were—for January, 300,840; February, 276,286.

It is often desirable to destroy the leeky taste of milk or butter. We notice the following is stated to be effectual: "We are informed by Mr. Dennis Rust, of this place, who has tried the experiment, that one teaspoonful of pulverized saltpetre, put into three gallons of milk, will entirely destroy the taste of leeks or ramps. Butter may be purified by the same process."—*Laporte Whig.*

Boussingault states, in his Rural Economy, that from 100 lbs. of milk he obtained—cream, 15.60; white curd cheese, 8.93; whey, 75.47; total 100.00. The 15.60 lbs. of cream yielded, by churning—butter, 3.33, or 21.2 per cent.; buttermilk, 12.27. And the milk, 100 lbs., thus yielded of cheese 8.93; butter, 3.33; buttermilk, 12.27; whey, 75.47. He states that for the whole of the milk obtained and experimented on at different seasons, being 36,000 lbs., he found that it yielded 1,080 lbs. of fresh butter, which it at the rate of 3 per cent.

In France: "M. Dumas read the first part of an interesting paper on the nature of the milk of different animals. He observes that the milk of herbiverous animals always contains four orders of substances which form part of their food, viz: the albuminous, represented by the caseine; the fatty substances, represented by butter; the saccharine portion of their food, represented by the sugar of milk; and, finally, the salts of different kinds which exist

in all the tissues of these animals. In the milk of carniverous animals there is no sugar, and there are only the albuminous, fatty, and saline substances which form the general constituents of meat. If, however, bread be added to the food of these animals, the sugar of milk will be found, although not in large quantities. M. Dumas concludes his paper by stating that his investigations have enabled him to arrive at a perfect analysis of milk."

In an article in the Cultivator of August, 1845, furnished by C. N. Bement, of Albany, on the quality of milk, he says: "An ordinary cow fed on young clover should give, for the first three months after calving, from 15 to 18 quarts of milk per day; which will produce, if of good quality, one and one-fourth pound of butter, or nearly nine pounds per week. The excellence of a dairy cow is estimated by the quantity and quality of her milk, and the quality of the milk is estimated by the quantity of butter that it will yield. Much depends on the quality of food, but more on the animal. The writer has known one cow whose milk would not produce butter, and never was discovered while milked with the herd, but was soon apparent when separated and milked alone."

He speaks of the lactometer, or instrument for measuring the relative qualities of cream of the milk of different cows at different seasons of the year. It consists of a stand with six glass tubes, and these are graduated with tenths of an inch. The milk of six cows is poured in, and the number of degrees of the thickness of the cream indicates the quality of the milk of the cows, &c. He says, further: "In a trial of seven cows, six weeks after calving, in March and April, they varied from 13 to 7½ per cent. Out of the seven the milk of two produced, after standing 24 hours in a temperature of 40°, 13 per cent. cream—one 12, and another 11 per cent.; another, at 46°, 9 per cent.; while two at 42° stood at 8½ and 7½ per cent. The milk of four cows, mixed in a temperature of 48°, marked 11 per cent." He declares, that "by various comparisons the result was, that the average quantity of milk of a cow when kept alone greatly exceeded that of our best dairy herds, and the quantity of butter made from a given quantity of milk is also greater."

In the Comptes Rendus an instrument is mentioned for measuring the quality of milk, called the lactoscope, which was favorably reported on by a committee for the purpose, and led to considerable discussion, M. Arrago and others objecting to its utility.

In the Massachusetts Ploughman, we have the portrait of a native cow which yielded in one week 15½ pounds of butter. The quantity of milk in one week was 108½ quarts; the greatest number of quarts any one milking of this week 10 quarts. Her food during this trial week was, a pretty good pasture, not extra, two quarts of meal a day, (half Indian and half rye.) She drank nothing but water. One day's milk weighed 38 pounds. It took, as will be seen, a little over seven quarts of milk for one pound of butter. This must certainly be considered very rich milk.

Another cow is mentioned in a paper as belonging to Mr. Lathrop, of South Hadley, which gave 14 pounds 2 ounces of butter per week. She gave in June, 1844, 55 quarts per day—so says the account; but we think it must be some mistake, and that the 55 should be 35. She was of the Durham kind, and cost, seven years ago, $700. In the month of October she gave 35 quarts of milk per day, and 10½ pounds of butter per week.

In the reports of the Agricultural Society of Newcastle county, Delaware, we find also a statement of the productions of an extraordinary cow. In

one week she gave 175 quarts, and the butter made was $2\frac{1}{4}$ pounds per day, or $15\frac{3}{4}$ pounds per week. Her lowest milking is put down at 14 quarts; her greatest, when fresh, at 26 quarts. Her greatest yield of butter at $2\frac{1}{4}$ pounds; her lowest at one quarter per day; averaging 1 pound 10 ounces per day. This was a native cow, raised by Mr. John Jones, of Wheatland, Delaware, by whom the account is given; and he claims that his cow thus takes the lead of the extraordinary cow of Mr. Forrest, in England, which gave $1\frac{1}{2}$ pound of butter per day for four years. The last time the experiment was tried by Mr. Jones, was when his cow, the Yellow Flower, had been giving milk four years, or since the birth of her second calf.

A cow called Kaatskill, which received the first prize of the New York State Agricultural Society in 1844, as the best dairy cow, belonging to R. Donaldson, Dutchess county, when kept on grass only, yielded $38\frac{1}{2}$ quarts of milk per day; and from the milk given by her in two days $6\frac{1}{2}$ pounds of butter were made, which is at the rate of $22\frac{3}{4}$ pounds per week. Her portrait is given in the January number of the Cultivator for 1846.

The greatest quantity of butter made by the celebrated Oaks or Danvers prize cow in one week, was $19\frac{1}{4}$ pounds; and the greatest quantity of milk in one day, 16 to 18 quarts. Col. Jacques's Creampot cow in three days gave 9 pounds of butter, which is 21 pounds per week. Six Durham cows of George Vail, of Troy, N. Y., made in 30 days 262 pounds 7 ounces of butter, which is an average of 43 pounds 12 ounces to each cow. The average quantity of milk per day for each cow was $22\frac{1}{2}$ quarts. They were fed on grass only. Others might be mentioned from Mr. Colman's list of 66 native cows, which gave large quantities of butter.

In one of his speeches in Ireland, Mr. C. mentions the Kerry cows, which are of a hardy race, and which give 320 pounds of butter in a season. Mr. Youatt, in his work on cattle, says: "The cow of Kerry is truly a poor man's cow; living every where, hardy, and yielding, for her size, abundance of milk of a good quality, and fattening rapidly when required."

The Ayershire cows, it is well known, possess similar characteristics; and in an account of a trial made between three Kerrys and three Ayershires, it is said the Ayershires gave rather the most milk; but the Kerrys exceeded them all in butter.

In an article in the Cultivator for March, 1845, headed "*Products of the Dairy*," we find it stated that the committee on cheese dairies of the New York State Agricultural Society reports Abraham Hall, of Floyd, Oneida county, as having made the past season, (1844,) from 40 cows, 23,427 pounds of cheese and 200 pounds of butter, an average of $585\frac{2}{3}$ pounds of cheese to a cow; and adding the butter, equal to 598 pounds to a cow. Mr. Fish, of Herkimer, made, previous to 17th September, an average of 592 pounds per cow; and he estimates the quantity for the season at 700 pounds. Mr. Porter, of Oneida county, from 12 cows and 3 heifers—one of them three, another two years old—made 2,600 pounds of butter for market, besides supplying a family from 7 to 9 persons, during the year, probably not short of 200 pounds. Another, from five cows expected to make 1,200 pounds.

In the Cultivator for September, 1845, we also find an article, entitled "*Connecticut Cheese Dairies*," which contains some interesting statistics on this subject. The average quantity of cheese reported from the single town of Goshen, is stated at 500,000 pounds; and of butter only about 40,000 pounds per annum. The average quantity per cow of cheese may

be estimated at 300 to 350 pounds. The first manufacture of the pine-apple cheese in America was commenced there in 1808, by Mr. Lewis N. Norton. A description is given of the mode of manufacture. He has 68 presses, and makes 28 cheeses per day; weighing, when dried, five pounds each, and it usually nets about 10 cents per pound. W. Norris Coe, of Winchester, (where one firm usually purchase about 500,000 pounds of cheese annually,) is also celebrated for making cheese, for which he usually obtains from 16 to 18 cents per pound, and which retails in New York and the southern cities at from 20 to 25 cents per pound. The two papers from which we have quoted above may be found in appendix No. 24.

Besides the dairy and its products, the *various methods of feeding cattle and stock* of different kinds, and *the use and value of their products*, may properly claim more than merely a passing notice. These are subjects which are extensively discussed in the ablest treatises, prize essays, and communications to periodicals, which continually issue from the agricultural press. The main difficulty is in making a selection, where there is so much that is valuable and well adapted to aid the agriculturist in every portion of our extensive country. It is a practice in many of the agricultural associations in England to invite, to aid in the discussion of subjects, men of distinguished science and practical knowledge; and thus much admirable instruction may often be found embodied in the reports of their meetings. The same, to a more limited extent, prevails in our own country. In the account of the meeting of the Loughborough Agricultural Association, contained in the Mark Lane Express of October 6, 1845, we find some valuable suggestions on the principles to be adopted in feeding cattle. They are the same as are adopted by the ablest lecturers on animal physiology on both sides of the Atlantic. Mr. Rawson, surgeon, after describing the elements in animals, proceeded to inform the meeting of the various uses of each. "Nitrogen," he said, "was the principal ingredient in flesh and muscles. Fat is composed of carbon and hydrogen. If they wished to make animal fat for sale or for show, they must feed it on carbonaceous food. Unripe straw is very carbonaceous. As the seed ripens, it becomes less so, and not so suitable for fattening. Cows generally feed well on aftermath. Half a pound of Swede turnips contains 110 grains of nutriment, while the same weight of white turnips contains only 85 grains. The outer temperature is very important; it should be brought as nearly as possible to the temperature of the blood. The same regard to temperature is necessary with respect to a milking cow. Fat is a mere deposite—a secretion; it does not impart strength—rather the contrary. Hence we do not make a horse fat for racing, but make him display muscular power. In fattening horses for sale, carbonaceous food, young grass, oil cake, Swede turnips, &c., should be given: in feeding for use, should be mixed with an equal quantity of other kind of food."

Liebig, it is well known, divides the elements into two distinct classes. Those which are formed by the combination of carbon, hydrogen, and oxygen, in different quantities, are what Liebig calls *elements of respiration.* Under this head are starch, fat, butter, sugar, and alcoholic fluids. By combining all the four elements, we obtain *the elements of nutrition*, or the *nitrogenized* constituents of food—such as vegetable and animal fibrine, caseine, albumen, and gluten. The constituents which are not nitrogenized are for sustaining the animal heat of the body, and protecting its parts; and thus provision is made to be used when the body is diseased. The

oxygen of the air destroys these. It is often found that if a cow is driven home from a considerable distance, instead of being milked in the field, much of the butter disappears, which is owing to the action of the oxygen of the air on those substances with which it most readily combines. The same reason, owing to the increased action of the muscles, is also why the milk of the cow after calving contains so little butter.

The less the food that is expended in maintaining the heat of the animal, the more butter she will yield. *Stall feeding*, it is thought, will effect this result; but then, as in the Dutch cheese, made where the cows are more confined, the product is not as well flavored. Most writers object to stall feeding on account of the want of exercise; and when the weather is warm there is no call for exertion to keep themselves warm, and the gentle motion they take increases the healthy state of the body, and thus they not only eat more, but also assimilate better their food. But in winter, the temperature being so much lower than their own bodies, and the air more condensed, and so containing more oxygen, they need more non-nitrogenized food to combine with the excess of oxygen; and hence it is that stall feeding, by preserving the warmth, produces a saving of food. The cooler the body is, the greater the expenditure of food.

On this account Mr. Bernays, the chemist, in his address before the meeting above mentioned, whose remarks we have thus embodied, recommends that the animals be regularly fed, have plenty of litter, and be kept clean. He says that if warmth is equivalent to food, the form in which food is given cannot be immaterial, and the more digestion is facilitated the greater the saving. By cutting up the food, some expenditure of force in its preparation is saved by the feeding animal. If the food contains water of a lower temperature than that of the animal, it must be raised to that temperature at the expense of a part of the food. Steaming obviates this difficulty. An ox, in a winter month, the air being 32°, consumed 60 pounds of mangel wurzel a day. No less than one twentieth of this food was needed in this case to raise the temperature of the water of the mangel wurzel to the temperature of the body of the ox. Pigs, likewise, thrive better on dry than on wet fodder.

"If the object be to increase and sustain the animal, as in the case of the young growing one," Mr. Wood also, a surgeon, says, "you choose those vegetables which contain a large proportion of muscular fibre or nitrogen and phosphate of lime for the bones; such as peas, beans, oats, barley, &c. If, in a full grown animal, you aim to sustain it and increase its fat, you give those vegetables which contain fat ready formed; as lentils, Indian corn, oil cake, &c. But with a mixed object in view, mixed food must be given, such as will produce bone, muscle, and fat, also." His explanation was—"There is no motion in an animal body, or emotion of mind, but what causes a corresponding absorption of the tissues of the body; and in order to keep up this daily waste, a certain amount of food is necessary. This is called sustaining the body. Thus, cattle working hard require a larger amount of food than when at rest. This necessity being attended to, constitutes health. But fattening is an unnatural condition, and requires an increase of substance. Hence the necessity of unnatural means, as the absence of exercise, light, and the influences of the atmosphere, a mixed diet, (to bring out all the materials of the animal body to the greatest perfection,) in a dry warm state. Mr. Childers's beautiful experiment proved that warmth alone, with an animal, would produce one third more of flesh,

and the expense of one quarter less food. Mr. Norton also proved that the absence of light, with warmth, produced still greater results. The reason of this is obvious. Every animal possesses both a nutritive and respiratory apparatus; the one to sustain the body, the other to support its vitality, by producing heat or warmth. This first object is effected by the gluten in the food principally, the basis of which is nitrogen; the second by the starch, sugar, and gum contained in the food, which form bile, the basis of which is carbon. The bile passes into the intestines, where it meets with oxygen, and thus becomes carbonic acid. In this state it enters the circulation, where it meets with peroxide of iron, (which the blood always contains;) the carbon unites with the iron, and forms carbonate of iron. In this state it passes to the lungs, where it meets with fresh oxygen during inspiration, which re-converts the carbon in the carbonic acid, which passes off during the expiration, while the peroxide of iron is re-formed and taken back by means of its carriers, to be again transformed into carbonate. The result of this combustion of carbon is heat. The heat of the animal body is nearly 100°. All food, therefore, before it can be assimilated, must be raised to its own temperature, which can only be done by the consumption of carbon; or, in other words, food. Potatoes, linseed cake, and oleaginous seeds, on account of the starch, sugar, oil, and gum they contain, are well adapted to accomplish this end." He then adverts to the great inattention which farmers pay to these principles, and adds: "Fat is a reservoir of carbon for the system to draw upon for the purposes of combustion, in the event of the food not containing a sufficient quantity of the proper elements to keep up the animal heat. As manure is the proper result attending the feeding of animals, it may be well to remark that its quantity depends upon the refuse of food and the amount of absorption going on in an animal's body; or, in other words, upon its own destruction; thus returning to inorganic nature, as food for vegetable life, the elements of its own nature. But the quality depends on the quantity of nutritious food given to the animal. The young growing animal, requiring increase as well as sustenance, consumes all the nitrogen and fatty matter in its food. The milking cow the same. But in the full grown feeding animal a large quantity of these ingredients is not consumed; a rich and valuable manure is the result."

Mr. Bernays also said that we must not judge of the value of the food by its *bulk*. Green top turnips, mangel wurzel, and red beet contain 89 per cent. of water, Swedes 85 per cent., potatoes 72 per cent., oats and wheat straw 18 per cent., hay, peas, and lentils 16 per cent., and beans only 14 per cent. He likewise stated that we should distinguish between fleshening, or the formation of muscle, and fattening, or the formation of fat. "According to the supposed fattening properties of food, it ranks thus: 1st, oats, barley meal, and hay; 2d, beans and peas; 3d, lentils, potatoes; 4th, turnips and red beet. According to their fleshening properties, they stand thus: 1st, lentils; 2d, beans; 3d, peas; 4th, flesh; 5th, barley meal; 6th, oats; 7th, hay; 8th, carrots and potatoes; 9th, red beet; 10th, turnips. 100 pounds of lentils are supposed to be capable of yielding 33 times as much muscle as 100 pounds of turnips." On this account there is great advantage in mixing food. "An animal fed chiefly on oil cake would, on being turned out, increase in size much more slowly than the animal which has been fed on hay, or on turnips and hay. The oil cake produces chiefly fat and little flesh; hence the movement of the animal will consume much of the ready formed fat or tallow. It is only where the oil cake is given with flesh-

ening food, such as beans, oats, and hay, that lean is proportionably formed. Warmth, confinement, and fattening food, are most favorable for the formation of butter, fat, and tallow. Herbage, which is generally denominated *poor*, but which, in reality, is *rich* in nitrogenized constituents, and which cows have to crop themselves, is favorable to the formation of cheese, but not of butter." He recommended food also to be given to animals in a warm state, "a little lower than the temperature of their own bodies." We have given somewhat at length the above account, as the science of nutrition seems to be presented in a very clear light, and the results of practice, in a great degree, will be found to correspond with the theory.

Some very interesting facts are stated on these subjects in a prize essay on fat and muscle, by W. F. Karkeek, veterinary surgeon, Truro, and which is published in the Quarterly Journal of the Royal Agricultural Society, vol. 5. After stating the theory of nutrition, he says: "From what has been stated, then, we may very safely conclude that fat is chiefly produced from the starchy matters contained in the food of animals, all the excess of which that is not consumed in producing animal heat is taken back into circulation, and deposited in the form of fat, in cells appropriated for that purpose. It would appear, also, that the bloodvessels have the power of taking back the fatty matter again into the circulation when it is required, so that one of the objects which this disposition fulfils is to store up, when nourishment is abundant, a supply which may be taken back into the system and made use of in time of need." He then adverts to Professor Playfair's discovery, that "animals possessing small lungs, small livers, and small spleens, indeed small offal of every description, have a greater disposition to fatten, and to lay that fat on the proper places," or a fair proportion of fat and lean, "than coarse-bred, ill-proportioned animals, which will be found to possess larger offal than well bred animals, in proportion to their size and growth;" and also mentions another fact, which has likewise been ascertained in consequence of inquires respecting the former statement, "*that in proportion as an animal fattened, so in proportion did the organs which are chiefly connected with nutrition become diminished in size*—a fact which he says is intimately connected *with the breeding, rearing, and feeding of animals*."

He illustrates the above position by reference to facts, and then draws the conclusion "that by pursuing the system of breeding from fatted animals, or from those having a great tendency to fatten, *function* must re-act on *organization*, and at last those qualities become not not only increased, but fixed in the race. He refers to different breeds to prove this.

He next adverts to certain *external signs* or *tokens* which indicate early maturity, or a determination of the animal frame to produce fat or muscle in an eminent degree—as, first, *touch:* as a thick, hard, unyielding hide indicates a bad feeder, while a thin, papery-feeling hide, covered with thin hair, indicates the reverse, as such an animal will speedily fatten, but not carry mnch muscle; and this, too, indicates a delicate constitution. "The perfect touch," he says, "in a feeding animal, will be found with a thick loose skin, floating, as it were, on a layer of soft fat, yielding to the least pressure, and springing back to the touch of the finger like a piece of chamois leather. This indicates hardiness of constitution, and capability of carrying plenty of muscle, as well as sufficiency of fat."

Smallness of bone is also another indication. "The *size of the head:* when the head of the bull approaches to the narrow elongated form of the

female, his stock will be certain to fatten readily, but will not carry much muscle;" *thin ears, fine horns, proportionate union of length, depth, thickness, &c.*

Another fact to which he alludes as important is, that "nearly the whole of the fleshy part of an animal which will afford any profit" to the farmer, "is assimilated chiefly during the period of its growth." "Thus the object of the farmer, whose purpose is profit, will be to force his stock on, during the period of their growth, by such kind of food as will produce the largest quantity of muscle at the least expense."

He recommends that growing stock, therefore, be fed with peas, beans, and barley meal, in conjunction with good hay, grass, and turnips, varied according to seasons and circumstances; also a change of diet, which he asserts is proved to promote health and appetite more than by limiting the quantity and quality. He gives, to aid in this, the following table, constructed by him from Johnston and Boussingault, in which the gluten, &c., indicate the *fleshening* properties, and the starch, gum, and sugar, the *fattening*.

	Produce per acre.	Weight of grain per bushel.	Weight of gluten, albumen, and caseine.	Weight of starch, gum, sugar, and fat.	Weight of water per acre.
One acre of—			*Pounds.*	*Pounds.*	*Pounds.*
Field beans - -	25 bush.	64 lbs.	450	672	256
Peas - - -	25 "	66 "	380	845	208
Oats - - -	50 "	42 "	290	1,168	336
Hay - - -	3 tons	–	480	2,790	752
Potatoes - -	12 "	–	600	3,330	20,250
Carrots - -	25 "	–	1,120	5,800	47,600
Turnips - -	30 "	–	800	6,700	56,950
Wheat straw - -	3000 lbs.	–	40	940	450
Oat straw - -	2700 "	–	36	970	324
Barley straw - -	2100 "	–	28	646	252

In commenting on this result, he says that "Swede turnips well may be called the raw material for the manufacture of beef." He points, also, to "the peculiar adaptation of the carrot crop to the rearing and fattening of stock," and also to the quantity of water contained in these roots, as rendering it desirable that dry provender, such as oat or barley meal, oat-straw, hay, or pea-haulm, be given to sheep to prevent the frequent scouring of these animals, and which, by making the food remain longer in their stomach, will impart a greater quantity of nourishment. "The best kind of food for pigs," he says, "is a mixture of barley meal, peas, and potatoes." Potatoes are frequently used by themselves for this purpose; but neither the fat nor muscle of pigs fed in this manner can be compared with corn grain and peas-fed pork, the fat having a tallowy appearance, and both fat

and muscle shrinking for want of firmness when boiled." Mr. Karkeek's whole essay may be read with profit by the agriculturist.

The editor of the Cultivator is disposed to doubt some of Mr. Karkeek's conclusions, especially that animals having naturally small lungs are most disposed to fatten is sustained by practical observation; and if it were demonstrated, he thinks it would by no means follow that farmers should breed cattle with this organization. He refers also to the West Highland cattle of Scotland to show that a tendency to fatten is not inconsistent with strength of constitution and muscular vigor. He, however, admits the great excellence and utility of Mr. Karkeek's essay.

In one of the numbers of the Cultivator, we find the following rules, which we subjoin, as furnishing the editor's ideas on the subject of fattening animals: "There are some rules which may be advantageously adopted in feeding animals, which, however obvious they may be, are too often passed over or neglected. Some of these will be specified; and,

"1st. *The preparation of food.*—This should be so prepared that its nutritive properties may all be made available to the use of the animal; and not only so, but appropriated with the least possible expenditure of muscular exertion and energy. The ox that is obliged to wander over an acre to get the food he should find on 2 or 3 square rods; the horse that is 2 or 3 hours eating the coarse food he would swallow in 15 minutes if the grain was ground or the hay cut, as it should be; the sheep that spends hours making its way into a turnip, when, if it were sliced, it could be eaten in as many minutes; the pig that eats raw potatoes or whole corn, when either cooked could be eaten in one-fourth the time—may indeed fatten, but much less rapidly than if their food was given them in a proper manner. All food should be given to a fattening animal in such a state that as little time and labor as possible on the part of the animal shall be required in eating.

"2d. *The food should be in abundance.*—From the time the fattening process commences until the animal is slaughtered, he should never be without food. Health and appetite are best promoted by change of food rather than by limiting the quantity. The animal that is stuffed and starved alternately may have streaked meat, but it will be made too slowly for the profit of the owner.

"3d. *The food should be given regularly.*—This is one of the most essential points in feeding animals. If given irregularly, the animal indeed consumes his food, but he soon acquires a restless disposition, is disturbed at every appearance of his feeder, and is never in that quiet state so necessary to the taking on of fat. It is surprising how readily any animal acquires habits of regularity in feeding, and how soon the influence of this is felt in the improvement of his constitution. When at the regular hour the pig has had his pudding, or the sheep its turnips, they compose themselves to rest with the consciousness that their digestion is not to be unseasonably disturbed, or their quiet broken by unwonted invitation to eat. All creatures fatten much faster in the dark than in the light, a fact only to be accounted for by their greater quiet. Some of those creatures that ar, & s most irritable and impatient of restraint while feeding, such as turkeys and geese, are found to take on fat rapidly when confined in dark rooms, and fed at stated hours by hand. There is no surer proof that a pig is doing well than to see him eat his meal quickly, and then retire to his bed to sleep, or cogitate until the hour of feeding returns."—*Albany Cultivator.*

The fact that sugar is contained in food has suggested the idea of using it as a means of feeding cattle. Molasses has accordingly been tried, and it is said with good results. Another case of the application of saccharine food is thus given:

"*Saccharine food.*—The Manchester Guardian, after quoting a paragraph from our last week's paper on the use of molasses for feeding cattle, says: 'Some 30 or 40 years ago, Dr. Cartwright, the inventor of the power-loom, communicated to the board of agriculture an interesting account of some experiments he had made on the effects of sugar in fattening sheep. He states that he gave to fifteen sheep 4 ounces of sugar per day each, mixed with other food, and in the short space of 28 days found that, on the average, they had increased one fifth in weight, and that two of them had increased upwards of one fourth. As to the cost of the sugar, he was of opinion that sugar, supposing it to be purchased at 4*d.* per pound, would, at the rate of 4 ounces per day, be paid for in a return of flesh, exclusive of the advantage of expeditious feeding and the benefit to be derived from the manure.'"—*London Times.*

The loss sustained by driving cattle, instead of transporting them on steamboats and railways, has been tested in Great Britain by experiment; and we find it stated in the Mark Lane Express, that "Mr. D. Martin, of Wainfleet, sent five sheep to London, to walk the whole distance on the road, and killed five others at home. The two lots were of exactly equal weight (858 lbs.) when alive. The carcasses were weighed when dead, when it was found that the sheep which had walked to London weighed 435 lbs., and their loose fat 60 lbs.; while the five killed at home reached 489 lbs., their loose fat weighing 74½ lbs. The total difference amounted to 68½ lbs., or 14 per cent. of the original weight of mutton; and this was evidently the loss of meat occasioned by compelling the five sheep to walk from Lincolnshire to London."

We take the following from an agricultural journal, the Maine Cultivator. It may, perhaps, admit of some doubt how far the quality of the milk might be affected by such a process of fermentation as is described. It would seem to resemble too much that obtained by feeding on distiller's slops, which have been the subject of so great complaint in New York city and elsewhere. "M. Chabert, the director of the veterinary school at Alford, England, had a number of cows which yielded 12 gallons of milk each per day. In his publication on the subject, he observes that cows fed in the winter on dry substances give less milk than those which are kept on a green diet, and also that their milk loses much of its quality. He published the following recipe, by the use of which his cows afforded him an equal quantity and quality of milk during the winter as during the summer: Take a bushel of potatoes, break them whilst raw, place them in a barrel standing up, putting in successively a layer of bran and a small quantity of yeast in the middle of the mass, which is to be left thus to ferment during a whole week; and when the vinous taste has pervaded the whole mixture, it is then given to the cows, who eat it greedily."—*Maine Cultivator.*

In [illegible] with the true principles of feeding cattle, is that of *soiling*, of which the editor of the American Agriculturist remarks: "The true principle of soiling consists in the combination of both pasture and stall or rack feeding; and where circumstances will justify it, both should be united at the same time. An abundance of succulent grasses, clover, pea-vines, cornstalks, or vegetables in the yard, with a supply of salt, lime,

ashes, and sulphur, with a daily ramble in the pasture for a few hours, where easily accessible, or, if not, then as often as practicable, would undoubtedly most effectually secure the greatest quantity of milk."

This subject has also been discussed in the New York Farmers' Club, and we may refer to the report of that meeting in the number of the New York Farmer and Mechanic for May, 1845, to present here some of the views there expressed. The advantages of soiling are thus stated by Johnson, in his Cyclopœdia: 1. Saving of land; 2. Of fencing; 3. Economy of food; 4. Better condition and greater comfort of cattle; 5. The greater product of milk; 6. The manure obtained.

Mr. Pell, of Pelham, New York, says that eight acres will afford more and better food than forty would, pastured; and the manure saved is sufficient to pay the interest of a large farm. "The Hon. Josiah Quincy, of Massachusetts, says, 'at the end of the soiling season I had $200 worth of manure; had kept 20 head of cattle on 17 acres; by pasturing, I had to allow 50 acres for 15 head; had my stock in prime condition; a full supply of milk all the season; saved all expense in cross-fences, (not requiring one rod of interior fence on my whole farm,) while previously I had 1,600 rods of fencing, and paid $60 yearly for repairs. The additional expense I had gone to in curing the food, and giving it to the animals, amounted to $163. My manure alone paid for this, and no consideration would induce me to abandon it.'" Others also gave their opinion in its favor. Dr. Underhill said, that where land was worth $50 to $150 per acre, he had no doubt of the value of soiling cattle. The manure pays for the expense of thus feeding, and less land is needed. He recommends combining with it the root crops. He mentions, also, in its favor, that in summer cattle suffer far less from flies and heat, cows give more milk, fatten more easily, and require less food; more manure also can be made in this way; and by adding leaves, &c., these resources are greatly increased; while he thinks the stock fattens with one-fourth less food.

Mr. Townsend also gave his opinion in favor of it. He soiled seven cows and a pair of horses on the produce of five acres. If they had been fed out, the feed would have been small for them. A number of papers on feeding and fattening cattle, &c., will be found in appendix No. 25.

The number of cattle in our country is great, and it is in many parts increasing rapidly. In the single county of Chester, Pennsylvania, a writer in an agricultural journal says that there are annually fattened 50,000 head. He states that in Lancaster and other adjoining counties there is also a growing enterprise in raising cattle and preparing them for market, owing to the fact that by the cessation of many distilleries, the grain which was so consumed is now converted into food for stock. The Chicago Democrat, speaking of that place, says: "We are inclined to the belief that Chicago is destined to be the greatest beef market in the United States, if not in the world. Beef fed on the prairies is always the tenderest and sweetest, which gives us the preference in the outset. Beef is now being packed here not only for the New York and Boston markets, but also for the Montreal and London markets. Messrs. Wadsworth, Dyer, & Chapin have been, and still are, slaughtering one hundred head of cattle daily, and they have now already engaged five thousand head to be slaughtered immediately. They are now packing both for the United States navy and the British government. Other firms are packing, but not so extensively as Messrs. Wadsworth, Dyer, & Chapin. We think something like two

hundred to two hundred and fifty are slaughtered in our city daily, and this number will soon be increased. The average price now paid by our packers is $2 50."

The subject of *sheep* has occupied much attention from various writers in the agricultural papers during the past year, and it is evident that there is an increasing spirit of enterprise, with regard to this species of stock, in different parts of our country. Considerable discussion has taken place as to the different breeds and the purity of the stock of Merinoes, as large flocks are mentioned as purchased in Ohio for States further west. Sheep are raised for a double object: for their wool, and for their flesh as food, and also for the sake of their tallow.

In an article in one of the agricultural journals, referring to an account of the trying up of sheep in one of the British colonies, the writer makes the following observations: "Whenever wool reaches a certain minimum price, the pelt, carcass, and tallow are worth more for the shambles than the animal is for his fleece; and it may be worth the inquiry, whether, on sufficiently cheap and well adapted pastures, sheep may not be a very profitable production for this object alone. It is certain that our western farmers have, for some years, found their advantage in slaughtering many thousands annually for this purpose. It would, perhaps, not be an extravagant estimate to put the number thus slaughtered in New York and Ohio alone at over 100,000 during the past season; and that, too, while wool is comparatively high, and with every prospect of continuing so. 30,000 have been thus disposed of in Buffalo and Cleveland—a single point in each of the above States. The business has been reduced to a perfect system in the colonies above named. Mr. Lloyd, of a steam-melting establishment at Port Philip, says: "We have given the result of tallow, that may be depended on, (our most anxious study,) and have arrived at the following conclusions, which we are certain will be found correct: 1st. That a sheep of the ordinary Merino breed, weighing 55 pounds, is just in nice condition for the shambles, and will produce, at the melting establishment, 20 pounds tallow; and for every pound over 55, four-fifths will be tallow. 2d. Young sheep, say two-toothed, will not produce as much as four-toothed and upwards, of same weight. The following results were obtained from six flocks of different average weight:

"Those averaging	44	pounds produced	$15\frac{1}{2}$	pounds tallow each.
	47		$16\frac{3}{4}$	
	48		$17\frac{1}{4}$	
	52		19	
	54		$19\frac{1}{4}$	
	65		$27\frac{1}{2}$	

"The above tallow was worth 28 shillings per cwt., which brought the average value of the lowest flock to 3*s.* 2*d.*, or 75 cents each; while the best reached the very handsome price of 6*s.* 10*d.*, or about $1 60 each, besides the pelt, which is usually worth 35 to 60 cents in addition. In this country the hams are extracted and cured like dried beef, or venison, and find a ready sale." We find various estimates of the quantity of wool cropped in different sections of the country. Thus, the Cincinnati Chronicle thinks the wool produced in Ohio amounts to about 2,000,000 pounds per annum. In Jackson county, Michigan, the yield is estimated at 50,000 pounds—worth $12,000.

In Ohio: "In the county of Richland, 200,000 pounds of wool have been

sold during the past season, at an average price of 30 cents per pound."

"*Wisconsin wool.*—There will be shipped from Wisconsin this season 50,000 pounds of wool, the clipping from 25,000 or 30,000 sheep in the Territory. A great portion of this large quantity will be sent to market from Racine, a flourishing village on Lake Michigan."

The Chicago account of the market, under date of June 23, says the whole receipts of wool there for the season would amount to 50,000 pounds. In the early part of the season, quoted by another public journal, we have the following statistics, which it may be useful to transcribe: The basis of the calculation is the year 1836, at which time there was in the country 12,897,658 sheep, each fleece averaging $3\frac{1}{4}$ pounds—making 41,917,324 pounds; excess of imports over exports for same year, 12,286,249: making total amount of wool in the country 54,214,573 lbs. Consumption estimated same year, 51,000,000 pounds. Excess of foreign and domestic wool over probable consumption, 3,213,573 pounds. In consequence of the inaccuracy of all such calculations, a reasonable allowance should be made; but, taking the above as the correct data, it is found that about one-fourth of the whole amount of wool in the country at that time was foreign, the estimated value of which was $1,270,000. Since then importations have fallen off gradually, with the exception of one or two years, while in domestic a great increase has taken place. The opinion of the increase of sheep varies from 15 to 33 per cent. per annum; but taking the minimum (say 15 per cent.) on 12,897,658, in 1836, up to the last year would give 33,000,000 sheep, which would yield at the rate as above 107,250,000 lbs. of wool. This year we have at the same rate over 38,000,000 sheep, and 123,500,000 lbs. wool; being an increase of 16,000,000 lbs. over last year, which, even at the low price of 25 cts. per lb., would on the whole clip amount to $30,875,000. When this statement was made, there was not taken into account Illinois, Indiana, Michigan, and Iowa, which at present have a great number of sheep. They increased rapidly last year, as the high price of wool induced a speculation in sheep; and the spring being favorable for lambs, the increase was unusually large in the old wool-growing States, part of which was driven into the new States, instead of coming east to be slaughtered as usual. The cheap and fertile lands and climate of these States make them well adapted for raising the lower grades of wool, and 18 to 25 cents in the eastern cities would remunerate them well, as the cost of transportation is very trifling upon their value, in comparison with other articles raised in the west. At these prices the foreign wool, which is now used for blankets, jeans, &c., would be driven entirely from the market. This would not be all; but we would have England and France as constant purchasers, as they would prefer our wool at these prices over the Mediterranean and Buenos Ayres wool, of which at present they are large consumers. The subject is well worthy of the western wool growers' attention. The time is near at hand when they will have to grow wool cheap enough for export, as we will have more than we can consume. Imports of wool:

	1844.	1843, 9 mos.	1842.
Cost under 7 cents	10,157,839 lbs.	2,866,211 lbs.	8,427,099 lbs.
Cost over 7 cents	130,161 "	217,285 "	739,240 "
Total -	10,288,000	3,083,496	9,166,339

This period includes from October 1, 1841 to January 30, 1844; and the table shows a yearly import of 7,835,255 lbs., or nearly 3,000,000 lbs. under the import of 1844.

The English papers state that in the months of August and September about 500 bales of wool were received from the United States; and during a subsequent month it is stated that 1,500 bales had been shipped to England from New York and some other ports. The importation of wool into Great Britain and Ireland, for 1844, was as follows: "*Importation of wool into Great Britain and Ireland in* 1844.—By an official report of the House of Commons, we find that the total quantities of sheep and lamb's wool, foreign and colonial, imported into the United Kingdom during the year 1844, amounted to 65,079,524 lbs., of which 5,402,098 came from Russia; 1,609,099 from Denmark; 21,847,684 from Germany; 1,346,613 from Portugal; 2,818,353 from Italy; 1,286,963 from Turkey, Syria, and Egypt; 1,101,284 from Morocco; 2,197,031 from Cape of Good Hope; 2,765,853 from East Indies; 2,186,291 from the States of the Rio de la Plata; 12,406,397 from New South Wales; and 4,411,804 from Van Dieman's Land. The total quantities re-exported from the United Kingdom amounted to 1,924,826 lbs. Exportation of wool from the above countries during the same year amounted to 8,947,619 lbs. Importation of other wools:—The quantities of wool of the alpaca and lama tribe imported during the year 1844 amounted to 635,357 lbs., of which 47,848 lbs. were re-exported to Belgium and France. The quantity of mohair or goat's wool so imported during the same period amounted to 1,290,771 lbs., of which 97,529 lbs. were re-exported."

"*Exportation of woolen manufactures.*—The gross total declared value of the British woolen manufactured cloths, &c., exported from the United Kingdom last year amounted to £8,204,836. Yarns of woolen and worsted, including yarn of wool or worsted mixed with other materials, 1,271,906 lbs."

In connexion with the subject of raising sheep, &c., we would refer to the appendix No. 26, where will be found some interesting papers. Among these is one on sheep husbandry of Kentucky, by Judge Beatty.

That the south affords great facilities for raising sheep has been repeatedly stated. In proof of the productiveness of this kind of stock in South Carolina, we find it mentioned that "Leicester lambs, 14 months old, from the flock of Colonel Wade Hampton, sheared from 11½ to 13¼ pounds of wool; and that 60 head of lambs dropped the *present year*, and shorn when hot weather came on, to relieve them from the oppressive heat of summer, averaged four pounds each." In the appendix No. 26, above mentioned, will also be found a very interesting letter from Germany, written to this office by Charles L. Fleischmann, esq., (formerly draughtsman in the Patent Office) respecting the fine-wooled fleeces of Prussia. Mr. Fleischmann having been thoroughly educated both as a scientific and practical agriculturist, in the celebrated Agricultural Institution of Schliessheim, in Bavaria, is well qualified to furnish valuable information on all the topics connected with agriculture; and the large collection of samples of wool which he expects to bring over to this country, will no doubt be of great value to those who are desirous of having the opportunity to select fine animals. He purposes also, it is believed, to lecture on this and kindred subjects connected with agricultural improvements on his return to this city. It would seem, from his letter, that the far-famed and long-celebrated Merinoes and Saxonys have lost their repute, and that the Prussian

sheep now hold the first rank; or, as he expresses it, have the "constant character." Mr. Fleischmann will be able also to give much information as to the mode of keeping sheep, &c.

Mr. Bingham, of Cornwall, Vt., gives, in one of the agricultural papers, the following account of his management of sheep: "My mode of management is this: I assort according to age and condition—the oldest by themselves; middle-aged, young ones, &c., into about nine different flocks, summer and winter. My hay is a mixture of timothy and white and red clover. I feed from 12 to 14 tons to 100 sheep, which is the principal feed, except for my stock-bucks, oldest ewes, and weakest lambs, to which I feed a small quantity of roots, with mixture of corn-cob meal. I feed my sheep in the pure air, in racks, and have sheds to shelter them in case of storms. My ewes and rams commence breeding at two and three years of age. The general average of lambs I raise is 97 to 100 ewes. Last year I raised from 132 ewes the same number of lambs. There were no twin lambs. I put my buck with the ewes about the first of December. I put the buck with the ewes about two hours each day, marking him on the brisket with red chalk; and then what ewes I find marked red I remove before putting in the buck again. At the time of lambing they run in the pasture, taking care to have them sheltered in case of storm. The live-weight of my bucks over one year old is from 115 to 145 pounds; the live-weight of ewes from 85 to 130 pounds. Buck lambs, four and four and a half month sold, weigh from 50 to 70 pounds. I sheared last year 530 fleeces; the average weight per fleece was 4 pounds 14 ounces. The sheep were washed in a stream of clear running water. I commenced shearing four days after washing. There were 51 yearling bucks, and 37 over one year old. The remainder of the flock consisted of stock ewes, one and two years old, and a few wethers. The average price of my wool last year was 46 cents per pound, with the exception of 334 pounds of grade wool. There has been no disease among my sheep excepting the grub in the head, which occasions more deaths, in my opinion, among sheep, than any other disease. The following I consider a sure remedy: To 100 sheep one and a quarter pounds Scotch snuff, mixed with four quarts of water. Throw it up each nostril by means of a syringe. This operation is performed by cutting a hole through a board large enough to admit the nose of the sheep two-thirds of its length from the eyes. It keeps the head perfectly steady, so that there is no difficulty in performing the operation. The average weight of my wool per fleece, this year, is five pounds three ounces. It is still unsold. I sheared this year 587 fleeces.

"MERRILL BINGHAM.

"Cornwall, Vt., *September* 8, 1845."

The following relates to wool-growing on the prairies of Illinois; it is communicated to the Albany Cultivator, by Messrs. T. & I. Harvey, of La Salle, Illinois: "But a few years since we emigrated from Vermont to this State. We soon became satisfied that wool could be grown much cheaper here than in our own native State. In 1843 we purchased in Columbiana county, Ohio, 2,300, and drove them through by land into this region. In crossing streams, without bridges, we managed to take about 50 to the water's edge at a time; and, by the aid of two shepherd's dogs, would crowd them into the river. Then these two dogs would go and aid the one that was left to guard the main flock, and urge them all up and

into the stream together. They would all swim over without much difficulty. They travelled generally about 12 miles a day. On our arrival home we let and sold all but 1,200. Our rule for letting was for one half the wool, and one half the lambs, and as many sheep returned as let, at the end of the year. We wintered them on prairie hay, and a very little grain fed after the month of February, not to exceed 160 bushels of corn. The first winter we lost about 60, and raised over 400 lambs. The second winter we fed part of the flock on timothy and clover—the balance on wild prairie hay. Those fed on the prairie hay did equally well as those fed on the English grasses. We met with considerable losses by dogs the second winter; otherwise the sheep came through finely without grain, except to about 30 stock bucks wintered by themselves: these we fed with a little grain daily through the winter. Our flock, at this time, amounted to about 1,050. We also raised this season over 400 lambs. The first year our flock yielded a little short of three pounds of wool to each sheep, and sold for 33 cts. This season we sold for 27½ cts. per lb., and the yield increased a little over one-quarter of a pound to the fleece. We procured good rams, in Ohio, at $10 each—said to be full-blood Merinoes. It is no more than justice to acknowledge the increase of our second clip from a lot of 64 lambs got by a yearling buck which we ordered from Vermont, from the flock of S. W. Jewett, said to be a son of his stock-buck Fortune. Every fleece from this flock of 64 was weighed as soon as shorn, and we did not find one that sheared less than 4 lbs. The lot averaged over 5½ lbs. One lamb, got by this young buck, and out of a ewe we purchased of Mr. Jewett, which dropped in the month of April, sheared this season a fleece of 8 lbs. 15 oz. of beautiful wool. We therefore have become satisfied of the difference in the breeds of sheep. We might have added that these two Vermont sheep bore the first prize at our State and county shows in 1843 and 1844. We think our sheep are better washed than we used to clean them in Vermont. Our mode of washing is cheap and expeditious. We run two fences angling from the stream where we wash, to guide the sheep at the terminus. We build a platform over the river; then, by the aid of our dogs, run them over this platform as fast as possible to give motion to the water. They are obliged to swim about four rods to strike the opposite bank. Then return them across a shallow place below, where they can wade the stream. We jump them off this plank work into the river three or four times, till we are satisfied that they are thoroughly cleansed. In this manner we might with two men and two dogs wash 10,000, if at hand, in one day. We cut wild prairie hay from land owned by government, and speculators who do not occupy. On contract, it is delivered in our yards at $1 each ton. The yearly cost of keeping our sheep cannot be over 30 cts. per head. One boy we employ the year at $8 per month. He has the sole charge of the flock, with the aid of two shepherd's dogs, which we could not do without. They aid in yarding them nights, and keep off the small prairie wolf. A Scotchman by the name of Mitchel raises and trains these shepherd dogs, from a pair of Scotch collies, imported by Murray & Co. He sells his puppies at about $4 each. Yours, &c.,

"TRUMAN & ISAAC HARVEY.

"La Salle, Ill., *September* 25, 1845."

The following table exhibits the results of the experiments of the distinguished agriculturist De Raumer on the effects produced by an equal

quantity of several substances in increasing the flesh, tallow, and wool of sheep.

		Increased the weight of the living animal.	Produced wool.	Produced tallow.
1,000 pounds	potatoes raw, with salt	46½ lbs.	6½ lbs.	12½ lbs.
Do	potatoes raw, without salt	44	6½	11½
Do	mangel wurzel, raw	38½	5¼	6½
Do	wheat - -	155	13	59½
Do	oats - -	146	10	42½
Do	barley - -	139	11½	60
Do	peas - -	134	14½	41
Do	rye, with salt -	133	14	35
Do	rye, without salt -	90	22½	43
Do	meal, wet - -	129	13⅓	17½
Do	buckwheat -	120	10	33

These results are said to agree with those of De Bombasle, and with those of a number of other agriculturists.

Connected with the subject of sheep may be noticed also the efforts that are making to introduce the *alpaca* into this country. Governor Paine, of Vermont, it is stated, has sent for a pair of these animals, to make trial of them; and we see it mentioned, likewise, that an association is formed in New York city which intends to appropriate some $4,000 or $5,000 to the same object. The Nashville Agriculturist, too, has the following notice:

"A company has been formed among the most wealthy and influential farmers of Bourbon county to import several alpacas immediately into this State. The shares are all taken, and the money paid in. A man has been chosen, and an agreement made with him to start before Christmas to South America for them; so that, within the next year, you may count with certainty upon seeing this most interesting and important experiment tested in Kentucky, by Kentucky farmers, to an extent and in a manner that must insure success, if our climate is at all suited to the constitution of this most valuable animal. Before I write to you again, I hope to see some of the company, and to be able, in my next, to give you a more detailed and particular account of this important movement."—*Nashville Agriculturist.*

The following fact shows the importance of this movement to introduce the alpaca into our country, both at the north and south; and we cannot doubt that our climate will be well adapted to them, and that they may also prove to us a source of national wealth. The cloth manufactured from their wool is now well known in the list of our cloths. At a late meeting of the British Association for the Advancement of Science, Mr. W. Dawson stated that six years before, he brought before that society a subject that received its countenance in an especial manner; which was, to induce manufacturers to exercise their ingenuity to discover means for consuming a wool of a silken texture in a manufactured state, and also to prepare the landed gentry and farmers to naturalize the animal called the alpaca, a species of sheep that eat that which the cow, the horse, the common sheep, &c., reject. He added: " The manufacturers have succeeded beyond my most sanguine expectation, and the naturalization also. The former has created a national wealth of £3,000,000 to £5,000,000 per annum; the latter is progressing rapidly. I have proved that these mountain rangers can be domiciled in our own country, though brought from beyond the

Andes mountains in Peru. I have tried the experiment in my own lands on the west coast of Ireland, in the wildest districts of the county of Kerry, and already a company is on the tapis to bring over 10,000 of those animals for the national good." He said that the race was nearly extinct in Peru, and therefore it was desirable to bring it over to the British isles; their wool approaching silk, and their flesh being improved by English air and pasture. The Queen and Prince Albert were wearing royal robes from the wool of some bred in Windsor Park. And he gave it as his opinion that "*in ten years these animals will add* £20,000,000 *per annum to the national wealth.*"

The Mark Lane Express has the following notice of the attempts to domesticate the alpaca in Great Britain; which seems to afford strong hope that the animal, when introduced here, will succeed:

"*The alpaca.*—It may be satisfactory to persons interested in the naturalization of this useful animal in the British isles to learn that some of the latest experiments have been singularly successful, fully establishing the fact that upon our soil the fleece improves in quality and in weight. G. A. Stirling, esq., of Craigbarnet Place, (Lennoxtown,) near Glasgow, lately sent 15 lbs. to Yorkshire, the residue of two fleeces clipped last year, the quality of which, although not finer than the best sorts imported, was nevertheless more glossy, and of one uniform jet color. This small parcel was since spun by Mr. James Whitley, of Morton mills, and manufactured by Gregory Brothers, of Shelf, into a web of thirty yards, mixed with ruby silk, the figure rose, shamrock, and thistle, (Queen's pattern,) on alternate stripes of black and ruby. This is the second instance of home-grown Alpaca being manufactured in this country, the first having been the Queen's, in last December. About two months ago, Sir Robert Heron, M. P., of Stubton, near Grantham, Lincolnshire, sent down a black fleece, just shorn on his own estate, with the view of ascertaining its mercantile value, which, by professional men, was pronounced the most splendid they had ever seen. It weighed 17 lbs., a most extraordinary weight; the fleece in Peru seldom, or ever, exceeding 10 lbs. This remarkable specimen of home-grown was sold to Messrs. Gregory Brothers at 2*s.* per lb. At the same time Sir Robert forwarded to the manufacturers a *machurga* fleece, white, and weighing 8 lbs., clipped from the hybrid, obtained by crossing the lama with the alpaca. This animal was imported from Peru, and purchased at Liverpool in the winter of 1842, and may justly be considered a curiosity, as being a rare specimen among us. In Peru this mixture is frequent; but, like the mule, the offspring is barren, and never used unless as a beast of burden. The fleece in question possesses some of the properties of the alpaca, such as its length, and a partial glossiness, mixed with the harsh hair and kemp of the lama, which, of course, is not a wool-bearing animal. The difference between this and the alpaca fleece is so great, that it is difficult to say what mercantile value can be set upon it. Samples of the three fleeces, above mentioned, together with patterns of the Queen's textures, including her favorite plaid, have been deposited at the Polytechnic."

Hogs, also, form an important item in the agricultural productions of our country; as the raising of swine is closely connected, in many parts of the land, with farming operations. A variety of articles relating to this subject may be found in appendix No. 27. A writer in the Cincinnati Chronicle says, that, taking the census of 1839 as the basis of calculation, there were 26,301,293 hogs in the United States, which, at 180 lbs. average for each,

and allowing them to be worth $3 50 per cwt., their value would be not less than $160,000,000, or three times the entire cotton crop for the year 1845. He supposes that, in the western States, commerce consumes about one-sixth of the whole number, though a less proportion probably would apply to the whole United States. He then enters into several comparisons, and, taking McGregor's statistics as his authority, says that the number of swine in all Europe, calculating on an increase of 10 per cent. on the table he gives for 1828, were as follows:

Russia	16,380,000
Austria	6,050,000
Great Britain	5,775,000
France	4,950,000
Italian States	2,750,000
Bavaria	1,650,000
Netherlands	1,540,000
Prussia	1,645,000
Sweden	1,320,000
Spain	1,100,000
Portugal	770,000
All other States	2,348,000
Total	46,278,000

Thus it seems that Russia, Austria, and Great Britain, with a population of 120,000,000 of people, have only as many swine as the United States with only 20,000,000. Eight western States, with a population of only 6,000,000, have as many as Great Britain, France, and Prussia, with 75,000,000. The proportion of swine in the United States is to Prussia as 6 to 1; Austria, 9 to 1; Great Britain, 7 to 1; France, 10 to 1; Spain, 16 to 1.

It is said in one of the public journals, that "A gentleman in the trade, just from Cincinnati, says the number of hogs slaughtered there in November will be at least 70,000. There is a strong body of eastern men on the ground buying. It was estimated that Kentucky would turn out 90,000, against 45,000 last year. Many hogs were being driven from the south in consequence of the scarcity of corn." An article in the American Agriculturist, quoted in the Ohio Cultivator, earnestly advocates the advantages of feeding and fattening hogs of a younger age than is commonly practised. He makes his calculations as follows:

"The pigs used for experiment were of three litters, from my own piggery, viz:

"A, three pigs, half Chinese and half Berkshire.

"B, three pigs, half grass and half Berkshire.

"C, three pigs, of same family as B, but a subsequent litter.

Class.	Farrowed.	Slaughtered.	Age.	Weight dressed.	Average.	Gain of weight per day during life.
				lbs.	lbs.	oz.
A	Oct. 10, '42	Dec. 17, '44	14 m. 7 days, or 433 days.	284 285 325	298	11
B	Oct. 22, '43	Do.	13 m. 26 days, or 421 days.	296 304 339	313	$11\frac{1}{12}$
C	April 10, '44	Do.	7 m. 27 days, or 241 days.	240 250 257	249	$16\frac{6}{12}$

"The pigs of class A had not the advantage of sucklings, the sow having died in the act of parturition. They are an encouraging example of what may be done by care and attention for a few days after birth. Each class was fed on the same kind of food, treated in the same manner, and attended by the same swineherd. B and C were weaned at 6 weeks old, and, till then, at no expense for food. As a further illustration of the truth of my hypothesis, let us, from the whole age of B, 421 days, and the whole age of C, 241 days, deduct the age when weaned, (42 days,) and we shall have the time fed of B, 379 days, and of C, 199 days. Again, let us, from the average weight of B, 313 pounds, and the average weight of C, 249 pounds, deduct the presumed weight if slaughtered when weaned, (20 pounds,) which gives the weight gained by B during the feeding, 293 pounds, and of C, 223 pounds.

C, 199 days,	229 lbs.	1 day=$18\frac{4}{12}$ ounces.
B, 379 days,	293 lbs.	1 day=$12\frac{3}{12}$ do.
Extra gain of C per day,		$6\frac{1}{12}$ ounces.

"But another and more common sense view of the subject is, that B was fed a little over 6 months, and gained 229 pounds. Difference for 6 months' feed only 64 pounds. Superadded to these facts, it must be admitted that B, from 6 months to 12 months' feeding age, consumed much more food than C consumed from 0 to 6 months; consequently, that B, during his whole feeding time, consumed more than double the quantity that C consumed during his whole feeding time. *Ergo*, that C was about 100 per cent. more profitable than B."

In the Mobile Daily Advertiser a statement, by way of calculation of the comparative advantage of raising stock in Kentucky and Alabama, is made respecting the profits of raising hogs in Alabama, which would seem to recommend this object of enterprise to the planters of that State. The writer bases his views on a farm employing 10 hands, and already stocked for operation. He says: "In Kentucky it would require a landed property of 325 acres; which would cost, at $15 per acre, $4,875. The ten hands would cost $5,000. Capital invested, $9,875. In this farm there would

be 300 acres of open land; 25 remaining wood, for convenience. The 300 acres of improved land would be cultivated in the following proportions: 50 acres in corn; 125 in oats and rye; 125 in clover and bluegrass; and 20 in artichokes. This would be the labor of 10 hands, which would only provide food sufficient to raise 300 hogs of one year old. The 300 acres of bluegrass, clover, oats, and rye, would receive 300 pigs, and pasture them from the 1st of May until the 1st October. It would then take all the artichokes and corn that would be made to feed the 300 hogs from the 1st of October to the 1st of May—seven months, (part of the corn having to be fed to the pigs while on pasture.) The hogs now one year old would weigh 150 lbs. each, and would make 4,500 lbs. of pork; which, at $2 50 per 100 pounds, would bring to the owner $1,122, sold in Kentucky. In Alabama it would require a landed property of the same number of acres as that of Kentucky. Let us now see if there is any difference in the profits of the capital invested. The 325 acres of land calculated for a farm of this description can be purchased in Alabama at $8 per acre, which would make a cost of $2,600. The ten negroes cost the same as in Kentucky, $5,000. The cost of the land and negroes in Alabama would be $7,600—$2,750 less than the outfit in Kentucky. Of the 325 acres there would be 300 acres in culture; 40 acres in corn and cow-peas; 125 acres in sweet potatoes; 25 acres in ground peas; and 100 in rye and oats. This would furnish food sufficient for 700 hogs. The 25 acres in ground peas would receive 700 pigs the 1st of September, and furnish them with food for two months, ending 1st November. The 125 acres in sweet potatoes would yield, at 250 bushels per acre, 31,250 bushels, which would alone feed the 700 hogs one year, allowing 4 quarts per day for each hog, which would be more than sufficient food for them one year. The corn, rye, and oats would be a reserve; and the Alabama farm of 300 acres in cultivation would yield 700 head of hogs of one year old, weighing 150 pounds each, making 105,000 pounds of pork; which, at $3 per cwt., would bring to the owner $3,150: showing a proceed of $2,028 more than the farm in Kentucky, with a capital of $2,750 less than was employed in Kentucky! The above is made upon a supposition that the hogs are to be kept in an enclosure and not suffered to run at large—to be dependant entirely on the product of the farm for sustenance. I have made the above estimate upon my own experience and information."

In the last report some observations were made in one of the appendices respecting the value of the *poultry* raised in this country. Increasing attention is now paid to this subject, and new kinds of fowls are introduced, and improvements are making every year as to breeding and feeding them. Many valuable suggestions are found in the agricultural journals, as well as in volumes especially devoted to the subject, respecting the methods of keeping them so as to be profitable. That it is a profitable business there can be no doubt. A single statement made respecting successful experiments will show this. In the Cultivator mention is made of one of these experiments, to ascertain if the raising of hens would be profitable, by James L. Cox, of Zanesville, Ohio. He says that in December and January, 1844–'45, he had 24 hens and 1 cock; the eggs hatched well in this proportion—110 set, hatched out 75 chickens. This was previous to July 1, 1845; and besides the eggs set, the hens laid in the same time 1,096 others. The grain eaten amounted to $4 25 for six months. He was prevented, by absence, from keeping an account for a whole year. W. Todd, of

Smithfield, Rhode Island, gives the following statement in the New York Farmer: "From the 1st of April, 1844, to April, 1845, my hens, 25 in number, have consumed 26 bushels of corn, at 75 cents per bushel, which amounts to $19 55, during which time I have sold in market 242 dozen of eggs, averaging 15 cents per dozen, which amounts to $36 30; no account being made of those used in the family. I have also sold $4 worth of chickens—in all amounting to $40 30. Here, then, I have left $20 75 clear profit." Philip Smith, jr., in the Cultivator for May, 1845 says: "The result for one year ending the 1st December, 1844, is as follows:

Poultry establishment.

Dr.		Cr.	
35 hens - - -	$4 38	88 hens - - -	$11 00
1 topknot cock and hen -	1 00	1 topknot cock and hen -	1 00
Grain for feeding - -	18 67	3,115 eggs - -	32 45
Rent of yard - -	15 00		
			44 45
Cost - - -	39 05		39 05
			5 40"

He also states that the stock hens had increased from 35 to 88, and that the increase is 53. His manner of keeping them is this: "I place a layer of saw-dust in a keg; then pack the eggs closely to each other with *the small end down;* over this place another layer of saw dust, packing closely to and between the eggs, where they do not touch, and so on filling the keg; then head it up tight and change it end for end every 24 hours." He says they will thus keep a year perfectly fresh and good.

A writer in the London Gardeners' Chronicle says that the following will be found an excellent method of fattening chickens: "Set rice over a fire with skimmed milk; let it boil till the rice is quite swelled out, then add a teaspoonful of sugar. Feed them three times a day in common pans, giving them only as much as will fill them at once. Let the pans be well washed, and set in clean spring water, that no sourness may be conveyed to the fowls, as that prevents them from fattening. Give them clean water, or the milk of rice, to drink. By this method the flesh will have a clear whiteness, which no other food gives. It is said that a portion of animal mixed with vegetable food causes poultry to thrive rapidly, but they should be confined to a vegetable diet for some time before they are killed. A quantity of charcoal, broken in small pieces, and placed within reach of the poultry, increases their appetite and promotes digestion." Some papers on the subject of poultry may be found in appendix No. 28.

In connexion with this general subject of poultry, also, we quote the following method of preserving eggs, from the Boston Cultivator, which deserves attention: "We have seen many recipes for preserving eggs, and have tried several without success. They have been saved in good condition, a year or more, in lime-water; but this requires much skill, as the lime-water may be too weak or too strong, there being a vast difference in the quality of lime. These nice chemical preparations may answer for those who are doing business on a large scale, but for common domestic purposes they will not answer. We put down some eggs in plaster of Paris last July, (1844,) in a close vessel. First, a layer of plaster, then a layer of eggs, not allowing one egg to touch another. On top we put a few inches of plaster, then covered the vessel over closely. The eggs were

fresh, being put down as fast as they were laid, or within three or four days. They were placed with the small end downward, and placed in a dry cellar. In another vessel we put down some at the same time, and in the same manner, with fine salt. Eggs from both lots have been tried every month from January; the last trial was on the 1st of this month, (June, 1845,) when the eggs had been put down nearly eleven months. They have all proved to be perfectly sweet and pure; and at the last trial, the white, in a raw state, had its natural taste, and those saved in salt had no perceptible taste of salt. The eggs looked, when broken, like recently laid eggs, excepting for the last three months. In those saved in salt, the yolk adhered to the shell; on this account, and as salt is liable to melt in a cellar, we prefer the plaster."

In one of the public journals, we find the following article on the egg trade of Cincinnati, which is worth perusal: "The egg trade of Cincinnati bids fair to rival the celebrated pork trade of that city, to an extent which will soon sink the *soubriquet* of Porkopolis to that of Eggopolis. It is, indeed, enormous—beyond computation. One firm alone (Townsend & Co.) during the first six months of this year shipped to New York 234 barrels of eggs; to Baltimore, 70 barrels; and to New Orleans 3,976 barrels! Each barrel contains 90 dozen; which makes the aggregate shipments 4,624,400 eggs! During the year ending as above, the egg trade of this firm amounted to $36,144 60. There are five other houses in Cincinnati engaged in the business. The foreign egg trade of Cincinnati the past year has amounted to 10,700 barrels; which is 963,000 dozen, or 11,556,000 eggs! The aggregate value of this trade for the year, according to the data here given, is $90,361 50. The business is a very hazardous one, owing to the great fluctuations in the New Orleans market. In the course of the past year, for example, western eggs have sold there as high as $22 per barrel, and as low as $3. In addition to this export trade, these establishments do also a heavy home trade. That of Townsend & Co. supplies regularly five steamboats with 36 barrels a trip; which, at 12 trips a year, is 432 barrels. It also furnishes constantly the consumption of several of the largest hotels, which use at least 260 barrels per year, and does a retail business amounting to not less than 33 barrels per year. These several amounts make 725 barrels to add to the 4,280 barrels shipped, which gives an aggregate of 5,005 barrels, or 450,450 dozen, as the annual trade of this one house. Besides this, the annual city consumption is estimated at 1,213,333 dozen. A further recapitulation shows the following results as to value:

Value of 10,700 barrels of eggs shipped from this port, at $8 44½ per barrel - - - - - -	$90,361 50
Value of 1,213,333 dozen eggs consumed in this city, at 8 cents per dozen - - - - - - -	97,066 64
Total annual value of the egg trade of Cincinnati -	$187,428 14

Among other objects which belong to the agricultural pursuits of our country, or connected with their domestic economy of the farm, may be mentioned *bees*. Great improvements have been made within a few years as to every branch of this business. Numerous hives have been contrived and patented, for the purpose of obviating the difficulties of hiving, to prevent the incursions of the bee moth, to save the swarms alive, and to subtract easily the honey when wanted. Many of them are constructed with

much ingenuity, and seem to answer valuable ends. In the Ohio Cultivator we find the following short article on the profit of bees, which seems to indicate that it is a branch of business which, under proper management, promises to repay those who engage in it: "As an instance of what can be done with a few swarms of bees, in good seasons and with good management, we give an extract from a statement furnished us, when travelling in this State two years ago, by Mr. D. B. Kinney, of Oberlin. Mr. Kinney commenced, in the spring of 1841, with five swarms of bees—four of them in Weeks's patent, and one in an old box hive. The debit and credit account stands as follows:

First year.	Dr.
To Weeks, for use of patent	$5 00
Cost of 11 new hives	16 50
Sheet-iron sides	40
Time and labor	6 00
Total	$27 90

	Cr.
By 11 swarms in hives, worth $7 each, (sold some at $8)	$77 00
Amount of honey sold	32 00
Honey consumed in family	5 00
Total	114 00
	27 90
Profit the first year	$86 10

The greatest amount of honey obtained from one hive was 60 pounds; the greatest amount from young swarm, 35 pounds. In the spring of 1842 commenced with 11 swarms.

Had 8 new swarms, worth (total)	$30 05
Amount of honey obtained, 515 pounds, worth	56 65
Profit second year, (averaging $7 85 per hive)	$86 65

"Greatest amount of honey obtained from one hive was 82½ pounds; greatest amount from young swarm, 39 pounds.

"The prices above stated, for swarms and honey, are those at which they found ready sale at the time. Mr. Kinney informed us that his bees had suffered very little from moths or other casualties, since the use of Weeks's hives. The honey has been of the finest quality, as well as extraordinary quantity. If any of his swarms appear weakly, Mr. Kinney puts two together in one hive."

An interesting letter of Mr. Kelly, on the subject of bees, will be found in the papers furnished by Mr. Ellsworth—appendix No. 1.

PREPARATION OF THE SOIL, SEEDS, &c.

The science of agriculture is advancing continually every year. The great principles on which tillage should be conducted, the economical re-

lations of one part of farming to another, are undergoing close investigation, and the elementary combinations by which fertility may be sustained or increased are studied, with accurate analyses of the soil, the crops, and the necessary aliment to be afforded. Discussions of a most interesting character are going on in the various periodicals to determine the comparative value of one method of tillage over another, and how far this or that preparation may answer for any particular portion of our country. We cannot, of course, enter largely into these various points, but it may be proper just to advert to some of them, and touch more or less lightly on others.

One of these is the *rotation* of crops. Of course these must vary according to the main object in view; but there can scarcely be a doubt that our farmers are, many of them, very negligent of the great principles on this subject. They go on cropping year after year successive yields of the same product, and yet they affect to wonder that, with perhaps increased diligence, they cannot obtain as large crops as when they begun. There is, however, no mystery in the matter. The soil calls out for a new supply of its exhausted materials, which some other crop might furnish, and which could be obtained through some other means of enriching it. On this subject Boussingault says: "That there is no absolute necessity for *alternation* of crops *where dung and labor* can be readily procured, is undeniable. Nevertheless, there are certain plants which cannot be reproduced upon the same soil, except at intervals more or less remote. The cause of this exigence on the part of certain vegetables is still obscure, and the hypothesis propounded for clearing it up far from satisfactory."

One of the marked advantages of alternate culture is, the periodic cultivation of plants which improve the soil. The main thing to be secured in the rotation of crops is such a system as shall enable the husbandman to obtain the greatest amount of vegetable produce in the shortest possible time.

The next point which we may notice is the practice of *extensive cultivation*. The consequence of this, in too many instances, is imperfect tillage and spare crops. Much ground has to be gone over to obtain results not more remunerating, if as much so, as were half the quantity of land employed. It might be a serviceable work if any one were to make an accurate calculation or comparison, embracing the additional fencing, the amount of additional travel to and fro, and time thus consumed in sowing, cultivating, harvesting, &c., the crop of the same number of bushels or pounds obtained on the larger farm so cultivated, and a smaller one tilled with the same amount of manure, &c. The loss thus suffered, it cannot be doubted, would prove a considerable item on many a farmer's year-book, were it carefully noted. There is, however, so much gratifying to human feelings in the possession of broad lands that we can hardly hope that, till our population has become really dense, our agriculturists will listen to the voice of science and true economy on this subject. A stinted culture, spread over numerous acres, may be the cause of lessened prosperity to many.

The subject of *draining* is one which is now commanding the attention of the agriculturists both of our own country and those abroad. It is maintained that the depth of soil may be thus increased. The system adopted and advocated is called the "frequent drain system," or "thorough draining system." The principle is, "the providing of frequent opportunities

for the water rising from below, or falling on the surface, to pass freely and completely off." Such is the statement of James Smith, of Deanston, Scotland, whose works on the subject are frequently referred to in the English agricultural periodicals. He says: "In the natural circumstances of the soil on the surface of the earth the drainage is extremely various, from that of the dry, light loam, incumbent on deep beds of open sand or gravel, to that of the thin, sterile crust of soil incumbent on massive beds of impervious till. In the former, there is no water springing to the soil from below, and whatever falls from the surface, in the shape of rain, is instantly absorbed, and passes through the sand or gravel to some outlet at a lower level. In the latter case, on the contrary, water, whether springing from below or falling upon the surface in the shape of rain, must either run slowly off over the surface, however great the distance, or, in the event of a horizontal surface, must remain stagnant till evaporated by the sun or absorbed by the atmosphere. On such a sub-soil a sufficient depth of active soil can never be long maintained; for even if trenched and enriched by lime and dung, it will bear but scanty and precarious crops; and if laid out for pasture, it will, in a few years, revert to its former thin crust, producing but the coarsest herbage. Some soils are incumbent on sub-soils partially or slowly pervious to water. Such, by judicious management, sometimes produce good crops in favorable seasons; but when much rain prevails the crops are neither bulky nor of good quality. Soils so situated are unfit for wheat, as the alternate frosts and thaws of winter, acting on the water in the soil, are sure to throw out the plants. When soil is immediately incumbent on open rock, especially on whin or greenstone, which is very open from its many fissures, the land is uniformly fertile." Professor Johnston says, as to the depth of the drain, that 30 inches is not too deep, and that the most intelligent and practical men are in favor of drains 3 feet deep. Great improvements have been made in Scotland by the drainage system. The following testimony to the utility of draining we take from an agricultural journal:

"*The magic effect of draining.*—A neighbor has a clay garden, which has sufficient inclination to carry off water; still, in spite of a large admixture of coarse manure, the sunrise would bake and crack it open in dry weather. Last spring he cut two deep ditches on each side of the garden, 40 feet apart. The result is, that the mechanical structure of the soil appears to be changed from a heavy tenacious clay to a light and porous loam, on which the drought of this season had no injurious effect."

Connected with this subject is another, viz: *deep or sub-soil ploughing.* The great importance of this has been thoroughly tested both in Europe and this country. In many cases it has proved a protection of the crop against the effects of the drought, besides enabling the farmer otherwise to obtain an increased crop. In appendix No. 29 will be found an account, by Rev. John Jaffray, of Dunbar, of an experiment on this subject, which is decisive. The practical conclusions, the author says, to be drawn from this experiment, are: "1st, that deep ploughing increases the produce; next, that as both portions of the land used in the experiment were opened up eighteen inches deep by the sub-soil plough for the crop of 1837, the full benefit of that operation is not obtained till the earth so loosened is again ploughed up. And the reason is evident; for it is then only that the soil is deepened, by an addition from the sub-soil with which it is intermixed, and rendered more fruitful. Lastly: If deep ploughing increases

the produce, it increases also the supply of vegetable manure; and a greater portion of manure, added to improved culture, must produce a progressive increase of fertility and of produce." Other instances are the following, which, as they are short, we subjoin from different journals: "*Deep ploughing.*—We have occasionally urged the importance of deepening the soil, by turning up and mixing with the surface small portions of the sub-soil, where its nature is such as to produce beneficial effects. We have known many instances of the beneficial effects of such a course. Dr. D. H. Robinson, of Farmington, Ontario county, New York, being compelled to prepare a piece of grass land for wheat, late in summer, ploughed it very deep —not less in any place than eight inches, but averaging nine or ten inches. This was thoroughly harrowed, with a small dressing of rotted manure, and sowed upon the inverted sod. The product was thirty-five bushels per acre, on land where twenty bushels are usually considered a heavy crop. Another very skilful farmer, of our acquaintance, finds so much benefit from the mixture of the sub-soil, that he considers a decided advantage would result, so far as raising wheat is concerned, if six inches of the surface of his land were entirely removed and carried off. Sub-soil ploughing would doubtless be useful, in such cases, to a certain extent; but we would more particularly recommend thorough trench ploughing—one plough to follow the first, so as to loosen and throw up the soil to the depth of at least one foot; the last team to be double, and attached to a strong plough."

From the Southern Cultivator.

Deep ploughing.—Mr. Camak: By your request, I give you the result of a trial made by myself, last year, in deep ploughing. Having received, late in February, several varieties of wheat distributed from the Patent Office, I immediately prepared a small piece of ground in the following manner: First, I ran a good turning plough, and followed in the same furrow with a long *scooter.* I attended to it in person, and am certain that the ground was thoroughly broken to the depth of both ploughs. The wheat, as I feared, was too late, and was destroyed by the rust. A thick coat of crab grass came up, and was suffered to grow until August, when it was cut and cured—making, on about a fourth of an acre, three cart loads of most excellent hay, of unusual length, measuring three feet and upwards. Indeed, it was the thickest and most luxuriant plat of grass I ever saw. The land was without manure; the season was unusually dry—so much so that I made but little over half a crop of corn. I had another piece of land left for the purpose of making hay, which I know to be a great deal richer, having had the drainings of the horse-lot for years. This received one single ploughing, but did not produce grass high enough to cut. These facts led me to reflect upon the cause of the difference between the product of the two pieces, without intending it as a comparative experiment. The result, together with the attending circumstances, satisfied me that the superior yield of the *unmanured* piece could be attributed alone to the *deep* and thorough ploughing it received in the spring.

Very respectfully, WM. RUTHERFORD, Jr.

Cowpens, Walton County, *March* 21, 1845.

Stirring the earth is likewise said to be very beneficial in dry weather. Experiments on this subject have proved this. And it is said that the dews settled on the newly turned earth, and imparted moisture; thus showing

that such an operation has a tendency to attract moisture to the roots of plants which lie buried in the earth. It is thought, also, that by moving the surface and keeping it in a light and porous state, it is enabled to *resist the heat* of the sun's rays.

A writer in the London Agricultural Gazette, writing on this subject, says: "Pulverization of the soil increases the capillary attraction, or sponge-like property of soils, by which their humidity is rendered more uniform. Gravels or sands retain little or no water; while stiff soils, as clays, which have not been opened by pulverization, either do not absorb water, or when by long action it is absorbed, they retain too much. The depth of pulverization must depend upon the soil and sub-soil. In rich land it can scarcely be too deep, and even in sands, unless the sub-soil contains particles noxious to vegetables; but very dry sands, if the season is hot or dry, should merely be stirred, otherwise the great evaporation of moisture, which would take place by deep pulverization, would render them too dry for the vigorous growth of plants. The grand object of deep pulverization is to cause the soil to retain heat and moisture, so necessary to the healthy growth of vegetables of every description. Some proportion ought to be observed between the depth of the ploughing, the nature of the soil and sub-soil, and the quantity of the manure annually spread."

In connexion with the preparation of soil may be mentioned the account of prairie cultivation, which is given by the late Commissioner of Patents, and which may be found in the appendix No. 1, including such papers as he has furnished to the office for this report.

The experiments respecting the *electro-culture* of plants do not seem to have resulted favorably, and the idea of its proving of any value is now discarded by the best agriculturists, both of this country and abroad. Professor Solly stated to the meeting of the British Association the result of a series of experiments, which in some cases seemed favorable, and in others not. "Out of a series of 55 experiments on different seeds, 21 appeared in favor of electricity, 10 against it, and 25 showed no effect whatever; and in carefully counting the whole number of seeds in the entire series, there were found 1,250 of the electrified, and 1,253 of the non-electrified. In conclusion, Professor Solly stated that he felt doubtful whether the effects observed were really due to the influence of electricity."

In the Electrical Magazine for October, the experiments of Professor Solly are also confirmed by the Rev. Mr. Sidney's statement. A process of quickening the germination of seeds, however, is referred to in the following extract from one of our public journals:

"*Important to agriculturists—electricity.*—A communication was read at the late meeting of the Royal Agricultural Society, England, from Mr. La Beaume, in relation to experiments in quickening the germination of seeds, invigorating their plants, increasing their fecundity, and improving the quality of their products, by means of elecricity. 'The means I have employed,' says the writer, 'are not atmospheric electricity, galvanism, or electro-magnetism, which cannot apply, but electricity developed by a machine of adequate powers, and by a simple, peculiar, and effective process, easily understood and easily used, with very little manual labor. The time required is on the whole about half an hour, and 1,000 bushels of wheat, or any other grain, can be electrified as easily as an ounce, at the same time. I beg also to announce that this, my process, applies equally to the resuscitation of the impaired vitality of old as well as bad seeds, to the revivification

of withering plants, and to the increase of the quantity and quality of their fruit. In order to a more extended trial, and to the establishment of the facts I have communicated, if several members will send me some packages of turnip and other seed I will freely and cheerfully electrify and return them in a day or two, so that success may be proved by an impartial trial under your auspices; and I shall neither seek nor receive any other reward than your approbation, and the satisfaction of diffusion of practical knowledge for the public good.' Further trials by Messrs. La Beaume, Earl of Essex, and others, were promised at the next meeting. We doubt not any American can readily try the experiment from the above notice. Its importance certainly should prompt them to do so at once."

A discovery, which it is thought may be useful to florists, &c., has been made in England by the secretary of the Royal Polytechnical Society, and which is both curious and interesting. It relates to the germination of seeds under colored glass. "By this it is proved that the yellow and red rays are destructive to germination; while under the influence of violet, indigo, or blue light, the process of germination is quickened in a most extraordinary manner. The *rationale* is, that every beam of light proceeding from its solar source is a bundle of different colored rays, to the absorption or reflection of which we owe all that infinite diversity of color which is one of the greatest charms of creation. These rays being known to possess different functions, the light which permeates colored glass partakes of the character of the ray which corresponds with the glass in color. Thus blue glass admits the blue or chemical rays, to the exclusion of others; yellow glass admits only the penetration of the *luminous* rays; while red glass cuts off all but the heating rays, which pass it freely. This affords a very easy method of growing plants under the influence of any particular light that may be desired."

On the *quantity of seed* to be used for an acre, there exists a diversity of opinion; the question of thin or thick sowing both having its warm advocates. By the subjoined table, prepared by the editor of one of the agricultural journals—we believe of the Cultivator—it will be seen that there is less seed used to an acre with us than in Europe. How far this may affect our comparative crops, may be worthy of attention.

	GERMANY.		ENGLAND.		UNITED STATES.	
	Seed per acre.	Product.	Seed per acre.	Product.	Seed per acre.	Product.
Wheat - - - - -	2½ bushels	25 bushels	2½ to 3½ bushels	28 bushels	1 to 1½ bushel	18 bushels.
Rye - - - - -	2 do	25 do	2 to 2½ do	25 do	1 to 1½ do	15 do
Barley - - - - -	2½ do	35 do	2¼ to 4 do	36 do	1½ to 2 do	25 do
Oats - - - - -	2 to 4 do	40 do	4 to 7 do	32 do	2 to 3 do	35 do
Millet - - - -	7 quarts	35 do				
Peas - - - - -	2½ bushels	26 do	3 to 3½ do	30 to 40 bushels	2 to 2½ do	25 do
Corn - - - - -	20 quarts	36 do	–	–	20 to 30 quarts	30 do
Turnips - - - - -	–	30 to 35 tons	1 to 2 pints	30 to 35 tons	1 to 2 pounds	20 tons.
Buckwheat - - - - -	1 bushel	27 bushels	1 to 1½ bushel	26 bushels	16 to 20 quarts	15 to 30 bushels.
Clover - - - - -	14 pounds	–	14 to 18 pounds	–	5 to 10 pounds	
Flax - - - - -	2 to 3 bushels	10 bushels seed	2 to 3 bushels	10 bushels seed	1 to 1½ bushel	8 to 12 do
Hemp - - - - -	2½ to 3 do	650 pounds	3 do	550 pounds	1½ to 2½ bushels	500 pounds.
Potatoes - - - - -	5 do	300 bushels	8 to 12 do	250 bushels	8 to 20 do	175 bushels.

A number of articles on the general subject of cultivation may be found in appendix No. 29.

MANURES.

The great facts respecting the operations of *manures*, it is believed, are now thoroughly established. The constituents of soils, of various grains and vegetables have been determined, and the proportions, in many cases, may be considered fixed with all the precision of the deductions of science. The theory advocated by one or another may not be free to every mind from objections; but the bearing of particular substances in the production of certain results is readily admitted. It is considered an axiom, it is believed, that there are certain substances which, when found in the soil, render it more than ordinarily fertile; and on the other hand, that there are certain things in the different kinds of plants or vegetables which render it necessary that they be allowed a particular adaptation of the soil, and its auxiliaries, in order to be successfully raised. The great object in relation to manures now seems to be to bring as much efficacy as possible into the smallest compass. Ammonia is admitted to exercise a great influence in production; and to fix this so as to derive its fertilizing power to the crop, is one of the ends proposed.

In preparing and preserving manures, as it has been said, the rational objects to be obtained are, first, to preserve and collect all matters containing the organic or inorganic constituents of the crops which we are about to raise; and, secondly, if the matters so collected are in such a state as not to be immediately available as food for plants, to render them so by artificial means. In these latter cases fermentation is the great operation, and this may be either hastened or retarded, accordingly as care is or is not taken in the disposition and arrangement of the materials, and in adding the necessary substances as helps in the process. Various methods are proposed, according to circumstances, to effect the object. Both science and practice have determined some general rules; but exceptions, too, will exist, so that it need not be thought surprising if experience sometimes runs counter to the views of even the wisest in these subjects. No doubt, also, in many cases, on closer scrutiny, it might be found that the conditions were not exactly similar; and that, perhaps, the failure may be the result of a deficiency, or an excess which has been overlooked, or considered too trifling to be taken into the account; but, for all practical purposes, the case may be termed an exception.

The opinion seems to be very generally entertained that the *liquid* manures, which have been too generally neglected, hold a very important place in the means of enriching the soil, which are at the command of the husbandman. The principle is universally maintained, that all manure must be in a soluble or decomposed state, in order to act either proximately or indirectly on the plant or soil. Though applied in a solid condition, yet, by moisture, &c., it must be made to give out its fertilizing properties, or it is vain to look for success from its use.

Professor Liebig, who is considered one of the ablest writers of the present day on the action of manures on plants, it is stated, "has discovered certain compounds, &c., which are of such a nature that different states of moisture in the atmosphere, or different localities, will not diminish their efficacy." In his pamphlet, he declares: "I have found means to give

to every soluble ingredient of manure, by its combination with others, any degree of solubility, without altering its effect on vegetation. I give, for instance, the alkalies in such a state as not to be more soluble than gypsum." "The reason why, in certain years, the best and most plentiful manuring is scarcely perceptible, is, that during the moist and rainy springs and summers the phosphates, and other salts with alkaline bases, as also the soluble ammonical salts, are entirely or partly removed. A great amount of rain or moisture removes in the greatest quantity the very substances which are most indispensable to the plants at the time that they begin to form and mature seeds." Again: "I have succeeded in combining the efficacious elements of manure in such a manner as that they will not be washed away; and thus efficacy will be doubled." He states that the following may be considered as the constituent elements of a powerful manure, applicable to all sorts of soils, viz: *phosphate of lime*, found in bones, &c.; *phosphate of magnesia*, which it is well known enters largely into the composition of the grains. *Alkaline phosphates* also are important elements of the seeds of grass, peas, beans, &c. The *Alkalies, (potash and soda,) sulphate of potash, chloride of potassium, salts of lime, salts of ammonia, decaying vegetable matters*, which contain carbon, are also useful. He thinks that an artificial manure may be formed to supply the place of guano. We have placed his whole letter in the appendix No. 30.

That he is mistaken in the probable speedy exhaustion of guano, we think is evident from the official report made to the Peruvian government in 1842, and published at Lima, under the authority of the treasury department. This report, it is stated, gives the result of a survey made by the order of the Peruvian government of three islets near Pisco, in latitude about 14° south, called the *Chinchas*, where is found one of the *many* deposites of guano which abound on the coast of Peru and Bolivia, to an extent of 800 miles. "The superficial extent of the deposites the surveyor found to be 1,554,406 square varas, (33¼ inches English is a vara,) and the depth to vary according to the irregular surface of the rock upon which it is based; but making liberal allowance for the points of rock rising above the bed of the general mass, he calculated an *average depth* of 60 varas, which gives the sum total of 93,264,360 cubic varas. The cubic vara of guano, as found in these deposites, weighs more than half a ton; but taking no account of the excess, we have here 46,632,180 tons, which, if extracted at the rate of 50,000 tons per annum, would last more than 900 years; and valued at $50 per ton, amounts to $2,331,609,000, a sum such as no mine has produced."

There are various other places where guano is found; but all the different kinds are not of equal value. The Peruvian and true Bolivia are esteemed the best: after these the first quality from Ichaboe; then the second quality from Ichaboe, and that from Saldanha bay. The Chilian is an inferior kind. The deposite at Ichaboe is mostly exhausted. It is stated that guano has been found on some of the islands in the gulf of St. Lawrence; and it is conjectured that it may be yet found on the coast of Labrador; also of Florida.

The principal ingredient which gives guano its great fertilizing power is ammonia; though there are other elements also, and animal matter, to be discovered by analysis. It has been thoroughly tested in its application to various descriptions of crops. The agricultural journals abound with proofs of successful trials, and the books and treatises on manures also

furnish similar evidence. One of the best pamphlets on the subject, detailing in plain language the experiments made in different crops, is that of Mr. Teschemacher, of Boston, called "*An Essay on Guano.*" Mr. Teschemacher is a strong advocate for its use, and offers many valuable suggestions, which we should like to transfer to our appendix; but the work being a copyright one, precludes such a free use of its pages, and we have not time now to condense its results. We have placed, however, in the appendix No. 30, a letter of J. P. Norton, from the Am. Agriculturist, which relates to guano and other manures. Also extracts from a letter of Mr. Pickett to the National Institute on the guano of Peru. A remarkable case of death produced by the inhalation of guano, furnished by the attending physician, will also be found quoted from a public journal in the same appendix, No. 30. The consumption of guano in Great Britain up to the 1st of July, 1845, is thus stated: "*Consumption of guano in Great Britain.*—In 1841 it amounted to 500 tons of Peruvian; in 1842, to 2,000; in 1843, to 5,000; in 1844, to 10,450 of Peruvian and 16,000 African; 1st July, 1844, to 1st of July, 1845, of Peruvian and African 135,550 tons—value, at £6½ average per ton, is £881,075, or $4,291,160; and the stock on hand (140,000 tons) $4,368,000; making $8,659,160 expended in four years for one species of manure." In the London Gardeners' Chronicle for June 28, 1845, under the title "*What will a ton of Guano produce,*" we have a computation, said to be furnished by a correspondent, as follows: Four cwt. of guano per acre will produce of turnips 25 tons; one ton, therefore, will produce of turnips 125 tons, and 125 tons of turnips will produce 31 tons of dung; which, at the rate of 2*s.* 8*d.* per ton, will bring £4 2*s.* 125 tons of turnips will give 1,500 pounds of beef—at 6*d.*, amounting to £37 10*s.* Produce of 1 ton of guano, £41 12*s.* Again: Five cwt. of guano will produce of potatoes 10 tons; 1 ton of guano will therefore produce 40 tons. 40 tons of potatoes will give £50. Produce of potatoes, £50. Produce of turnips, £41 12*s.* Balance in favor of potatoes, £8 8*s.*; sufficient to purchase a ton of guano. But to show the value of guano in its true light, on a broader view, we will suppose that there are few farmers in this country who do not grow their five acres of green crops. To effect this with dung alone it will require (at 40 yards to the acre) 200 cubic yards, which most farmers can manage to raise on the homestead. Five acres of turnips, at 25 tons to the acre, will give 125 tons; yielding, as above, £41 12*s.* The same manure distributed over 10 acres, along with 1 ton of guano, (20 yards dung and 2 cwt. of guano per acre) at a cost of £10, will yield double the quantity of turnips; which turned into beef and manure, will yield, at the same ratio, £83 4*s.* The profit arising from a ton of guano, after deducting £10 for its price, is £31 12*s.* This is the profit from one crop only, on five acres."

It is well known that guano is the dung of fowls, and our farmers therefore have it in their power, by saving the manure of their poultry yards, to avail themselves to a considerable degree of the benefits of this special fertilizing substance. A bushel of hen's dung will have a decided effect on their vegetable crop; and, as it may be applied to advantage in a liquid state by adding water, it can be made to go further.

Some of the poudrette manures are also valuable for the same purpose. In the appendix No. 30 will likewise be found the account of Mr. Pell's experiments with prepared manure, read by him before the American Agri-

cultural Association, and which we have taken from a late number of the American Agriculturist. In the same appendix we have likewise included some other papers on the subject of manures, which, as will be seen, we have taken from various sources. Had we sufficient time and space, we might insert a great variety of experiments, which we have noticed on record, as to the efficacy of different manures. Bones, salt, charcoal, nitrates, anthracite, and other ashes; lime, and a great number of other articles, are commended for particular purposes. Indeed there is scarcely any refuse which may not be made valuable for this object; and our farmers have yet to learn the secret of the wonderful powers at their command, if they will only read and reflect, and apply the knowledge they may thus obtain as to fertilizing their lands.

The following useful suggestions we take from the American Agriculturist. It applies to other cities and towns besides New York. "We will make a simple suggestion to the public, without charge. Insert under each aperture of a privy, drawers made of wood, iron, or metal, two feet wide, two feet deep, and any required length, with handles at each end, so that they can be as easily drawn out and handled as those of a desk. Put into these drawers peat, mixed with a little plaster of Paris, or charcoal dust, mixed with plaster, to the depth of six inches or a foot. Thus arranged, not the slightest unpleasant smell would arise from the privy; and, every week or fortnight, carts, with tight boxes in them, should call at the house, and the drawers be emptied into them. In this way the yards would be purified of a shocking nuisance, and vast quantities of poudrette could be weekly manufactured, for which any company could well afford to pay the city of New York $100,000 per annum. Oil of vitriol diluted in water, at the rate of five pounds to a barrel, poured into a vault of moderate size, will completely disinfect it. Where drawers are placed to catch the fæces, as directed above, no other liquid but urine should be emptied into them. Boussingault estimates the solid and liquid excrements of a man at 618 pounds per annum, containing 18 pounds of nitrogen—a quantity sufficient to grow 836 pounds of wheat."

From other public journals: "Lord Torrington has just issued from the London press a small work 'on the agriculture of Kent,' in which he says that for ten years he has never failed to grow a good crop of Swede turnips 'by invariably putting charcoal in the drills with the seed.' He pulverizes the soil very fine before planting, and scatters (after the seed are in the ground, and before they are up) a top dressing of common salt, at the rate of 200 pounds to the acre. Wood ashes, bone dust, and guano, are all used in Kent for both turnip and wheat crops. Ashes, coal saturated with urine, and salt, are the cheapest and most valuable fertilizers to be had in this country."

"*What next?—Sugar recommended as the cheapest and best manure for turnips!*—A writer in the English Mark Lane Express of the 5th of May, says: 'Farmers are busy in preparing ground for potatoes and turnips, and the fallows generally are in a forward state. This is the period now, and from now till June, for the farmer to be on the alert. If he loses his turnip crop it is more his fault, in the majority of cases, than any controlling cause. His motto should now be, to keep his soils moist by compression; and the seed is certain to germinate, and go on, too, if he will but supply the young plant with the necessary food. Sugar will, (now the price is reduced) I have no doubt, be extensively used. I speak from ex-

perience when I say that, of all extraneous manures, if one it may be called, it has produced more visible effects in the least space of time than any other I ever used, and is strictly what the turnip plant requires in the first stage of its growth. I would strongly recommend it to be tried on a small scale, mixed with ashes.'"

Again, from the Boston Cultivator, which derives it from an English source: "The waste of manure from the farm-yard (especially the liquid portion) has of late been the subject of frequent remark. One of the best constructed yards in the country, for the purpose of securing *all* the manure raised, is that of R. Spooner, esq., M. P., of Brickfields, near this city, who, our readers are aware, has a fine farm of from 150 to 200 acres in the highest state of cultivation. This farm-yard has excited the admiration of a correspondent of a western paper, who states, upon seemingly good authority, that Mr. Spooner has not expended a shilling for manure for many years, (with the exception of a trifling sum for the lately introduced novelties, by way of experiment,) but has sold much farm-yard manure to his neighbors, not knowing how to dispose of it on the farm. Although he does not possess an acre of watered meadow, he has generally hay for sale. In the centre of Mr. Spooner's farm-yard is the manure pit, six or eight feet deep, covered by a roof and surrounded by a dwarf wall, so as to prevent the possibility of any water getting in. It is of the same form as the yard, but leaving sufficient room for a carriage way between it and the building. It is entered by an inclined plane, wide enough to back in a cart opposite the approach to the yard. Into this pit the dung from the stables and cow-houses is promiscuously thrown; in the middle of the side contiguous to the latter is a well and a pump, which receives the drainage therefrom and the stables, which is pumped up and spread over the manure by a shoot. The surplus liquid that is not absorbed is drawn off by means of a drain into a receiving well in the stock-yard, where it is pumped up into the liquid manure cart and drawn out on the mowing ground as soon as the grass is cut, until such time as it is laid up again; in the spring it is otherwise disposed of, on headlands and heaps of soil. Liquid and solid manure, prepared in the way above described, preserves all its nutritious qualities; the one is not diluted with water, and the other is not suffered to deteriorate by overheating, and is of treble the value of that made in the common manner."

Again: "Mr. Brown finds that plaster, applied to his manure heap and his stables, has added 50 per cent. to the strength and value of his manure. He sows plaster over his barn-yard once a week. Mr. Brown has used salt as a manure with great benefit. He sows it broadcast upon wheat and grass, at the rate of from three to five bushels per acre. On grass, he would sow it in the fall; for wheat, he would sow it just before the wheat is sown. He found that three bushels of salt to the acre on his wheat field, occasioned an increase of seventeen bushels of wheat to the acre over that which had no salt. The soil was a strong loam, with a stiff sub-soil. Mr. B. had not tried salt to kill wire-worms."

"M. Boussingault made a communication relative to a new ammoniacal manure. Having remarked that magnesia, the basis of which has always been regarded as injurious to vegetation, was found in the ashes of all vegetables, and in a proportion in accord with the quantity of phosphorus also found in the ashes, and of that of the azote, which enters into the composition of plants, he was led to infer that vegetables must assimilate with

ease and advantage the ammoniated magnesian phosphate. Being desirous of verifying this by experiment, he planted, on the 1st of May last, some grains of early maize, which had already germinated, in two series of pots, into the half of which he had poured 15 grammes (about half an ounce) of double phosphated salt for each pot. The two series of pots were then placed in the open ground. During the first twenty-five days, the vegetation was the same with both series; after that, there was a difference in favor of the pots which had been watered with the phosphate. On the 25th July, the plants in them were double in height those of the other series, and the diameter of the stems was two-thirds thicker. By the 25th of August, the proportion had diminished: the height of the plants watered by the phosphate was then only one-third greater, and the size of the stems double. At the moment of their coming to maturity, the phosphated plants bore two sound ears and one that had failed to come to maturity; the other plants had only two ears each, viz: one complete and one that had failed. This was not all; each grain of the ears of the phosphated plants was double in weight to that of the non-phosphated plants. M. Boussingault concludes, therefore, (and with great reason,) that the salt in question may be used with great advantage as an artificial manure."

Mr. Weller, of North Carolina, in one of his communications to the North Carolina agricultural paper, has the following recommendation for improving the land:

"I observe, ere I close, that one most effectual means, as I have found by years of experience, to make land better, is that of covering small grain, immediately after sowing, (but if wheat, when up, and at leisure, during winter,) with pine leaves or straw from the old field or woods an inch or so deep, spread over evenly. I have frequently doubled my crops of oats, wheat, and rye, this way. On that part of a field thus covered and shaded, twice as good as the part not covered. Besides, the ground, by the after decomposition of that vegetable matter, is gradually improved. And one grand advantage of this covering of small grain is, that even sandy land (if sufficiently rich at least) may have a clover crop thereon, sown with or after the small grain, (if wheat, in spring, after covering in winter,) without the usual danger of being burnt out by the hot sun and dry weather of summer. Indeed, I have found such repeated covering equivalent to marl, and less trouble of putting it on. Where pine straw is not to be had, wheat straw or other litter is equivalent, and perhaps better for wheat, on the principle lately discovered, that the straw or litter of any kind of plant makes the best manure for the same. Hence, cornstalks are the best litter for corn, if managed as before stated." In connexion with this subject of manures, it may not be inappropriate to subjoin the following statement of the analyses of different crops, as they show the constituents required for their production. With comparative tables of analyses of manures and soils of various description, arranged correspondingly, the farmer would be much aided. We have not been able to lay our hands on any such tables, or found opportunity or materials with which to compile them; though, perhaps, by long search they might possibly be obtained from a great variety of publications. Sprengel has the most extensive analysis of soils and manures of which we know; but we do not find all we seek there, nor in Thaer, Veit, or Boussingault, and other authors whom we have consulted. In Burger's Economy of Farming may be found many tables, as to soil,

from Schubler and Sprengel. We take the following from the New England Farmer, furnished by Mr. Teschemacher:

"The English agricultural societies have voted a considerable sum of money for the purpose of analyzing the ashes of plants, none of the analyses yet made having been found satisfactory; and those of Sprengel, as Liebig justly observes, being altogether incorrect. In the mean time, however, two German chemists, Messrs. Fresenius and Will, in the laboratory of their great master at Giessen, have undertaken the analyses of ashes of seeds and plants, and have recently published an account of them, with the methods pursued, and the precautions taken. Some of their observations and results I propose to give, as I find by the last number of your paper that this information is desired. It would be misplaced to give here the beautiful processes by which the analyses of these gentlemen were performed; the *results* will, no doubt, be more satisfactory. The first I give are 5 out of 10 specimens of tobacco grown in Hungary, on land in various districts, which had never been manured, and on which this plant had been some time cultivated. And in these we shall see illustrated the beautiful law of substitution of one base for another, which may be wanting in the soil, as laid down by Liebig. It will be observed that as the quantity of potash decreases, that of lime increases; the former being exhausted out of the soil, is replaced in the plant by the latter, which is in plenty. There is no doubt, however, that this substitution must cause a difference in the quality, and is, therefore, a subject worth studying by the tobacco planters of this country. I give only those made after deducting the carbonic acid, the charcoal, and the sand.

Analyses of five specimens of tobacco.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Potash - - -	29.08	30.67	27.88	18.20	8.20
Soda - - -	2.26				
Lime - - -	27.67	24.79	31.16	27.86	42.77
Magnesia - -	7.22	8.57	7.31	15.73	13.93
Chloride of sodium -	0.91	5.95	9.34	11.41	3.22
Chloride of potassium -	–	–	4.90	3.92	8.53
Phosphate of iron -	8.78	6.03	6.39	6.80	6.07
Phosphate of lime					
Sulphate of lime - -	6.43	5.60	6.43	10.11	7.96
Silica - - -	17.65	18.39	6.59	5.97	9.32
	100	100	100	100	100

Analysis of wheat, rye, and peas, (deducting the carbonic acid, charcoal, and sand.)

	Red Wheat.	White wheat.	Rye.	Peas.
Potash - - -	21.87	33.84	32.76	39.51
Soda - - -	15.75	–	4.45	3.98
Lime - - -	1.93	3.09	2.92	5.91
Magnesia - - -	9.60	13.54	10.13	6.43
Peroxide of iron - -	1.36	0.31	0.82	1.05

Phosphoric acid - -	49.32	49.21	47.29	34.50
Chloride of sodium	–	–	–	3.71
Sulphuric acid - -	0.17	–	1.46	4.91
Silica - - -	–	–	0.17	
	100	100	100	100

The reason why the charcoal and the carbonic acid are left out, although they are given in previous analyses, is, that they may be considered, for our purpose, as accidental ingredients, inasmuch as in most the quantity depends on the texture, on the quantity and quality of the bases they originate in the combustion, and depend much on the degree of heat used. The ashes of seeds, so far as their composition is known, consist, like those of the blood of man and of other animals, chiefly of the phosphates of the alkalies and the alkaline earths. The curious fact, moreover, has been lately observed, that the phosphoric acid is not, in all seeds, combined with the same number of equivalents of fixed bases. The seeds of leguminosæ and the coniferæ contain tribasic phosphates, (earth of bones is a tribasic phosphate.) The seeds of cerelia, also buckwheat, hemp, and linseed, contain bisadic phosphates. This relation is maintained when seeds are grown in different localities. The quantities of oxygen contained in the bases of these seeds, leaving out the unimportant sulphates and chlorides, are so nearly alike, that it is evident that the law of substitution of bases applies also to the phosphates.

Analysis of buckwheat, barley, oats, linseed, and sainfoin.

	Buckwheat.	Barley.	Oats.	Linseed.	Sainfoin.
Potash - - -	8.74	3.91	12.9	25.85	6.75
Soda - - -	20.10	16.79	–	0.71	20.33
Lime - - -	6.66	3.36	3.7	25.27	
Magnesia - -	10.38	10.05	7.7	0.22	8.57
Peroxide of iron - -	1.05	1.93	1.3	3.67	
Phosphoric acid - -	50.07	40.63	14.09	40.41	54.89*
Sulphate of lime - -	–	–	–	1.70	2.87
Silica - - -	0.69	21.99	53.03	0.92	1.10
Sulphuric acid - -	2.16	0.26	1.0		
Carbon - - -	–	–	4.7		
Chloride of sodium -	–	–	0.5	1.55	2.18
Phosph. of peroxide of iron	–	–	–	–	3.31
Oxygen of the bases -	11.96	11.70	14.95	12.76	

"*Analysis of maize, by Letellier, at Bechelbronn.*—Potash and soda, 3.08, and loss; lime, 1.3; magnesia, 17.0; phosphoric acid, 50.1; silica, 0.8. Total 100."

In this connexion, we may also add some articles relating to the methods of planting various crops together, &c. We have already furnished some examples under the head of an individual product. But there are others which we deem worthy of notice, and which appear to come in better with this part of the report than in any other. We shall throw a portion of them into the appendix No. 29. The account rendered by John Jones, of Wheatland, Delaware, respecting his farming operations, is an interesting

* Phosphate of lime.

one. His farm, to which he removed on the 4th of March, 1834, and which contained 360 acres in Delaware, and 30 acres in Maryland, when he entered upon it was in a very poor state, and scarcely paid six per cent. on the purchase money. In 1837 he commenced liming it, and, up to 1839, put on 12,000 bushels of lime, at a cost, at the kilns, of 20 to 22 cents per bushel. By 1840, he saw and felt the good effects of the lime, and determined to go on and complete the first dressing of all his arable lands, as well as another farm of 380 acres. He purchased 10,000 bushels of lime, at 17 cents per bushel. Previous to 1840, he had sown clover and other grass seeds pretty freely—one year as much as 45 bushels; and the same year he purchased 20 tons of plaster. At first he got but a poor return even for his lime, as he supposes, for want of vegetable matter; but when his clover had grown so as to make a swath or lay for turning under, his crops began to increase even beyond his expectation. The crops for the year 1844, which closed with his best wheat crop, were all got out and sold by the 25th of July, producing the following results: Oat crop, light, not many sown—crop sold for $209; rental share, $104 50. Corn tillage, large—97 acres, including an orchard of four acres, not well tilled, produced 3,000 bushels; rental share 1,500 bushels—at 40 cents, $600. The wheat crop amounted to 2,820 bushels, exclusive of brock or rakings; the rental share one-half, or (say) 1,410 bushels—at 90 cents, $1,269. It was grown on two fields—one of which of 97 acres, a clover lea, well turned under, produced 1,872 bushels, exclusive of brock; which would have made this field amount to over 20 bushels to the acre, $1,973 50. Add 64 bushels of brock, at 90 cents per bushel, ($57 60,) and we have $2,031 10. His other field of wheat contained about 60 acres. The product of this field was 948 bushels, exclusive of rakings; or, had they been included, the yield would have exceeded 16 bushels to the acre. This field had been hard cropped, for the wheat followed corn; which corn had followed wheat stubble the year previous, without clover or manure. Indeed, this field has had nine crops in 12 years, with but little manure at any time, it being farthest from the farm-yard, and his place is poor land near by. The principal help this field had was 40 bushels of lime to the acre, put on in 1838, and two crops of clover turned under; and on a part of the field a crop of oats was turned under that had been injured by the hail storm of 1840. The rental value of these three crops of oats may be set down at $2,031 10; allowing, according to usage, half of the grain for rent; and this pays the interest, at six per cent, of the capital of $33,850. The original cost of the farm was $4,100. The cost of the lime, 40 bushels, was long since reimbursed. Including his stock, &c., he considers his farm yielding a rent equal to the interest of $100 per acre; and his crops have been gained by ordinary good tillage, a rotation of crops, and 50 bushels of lime. In the London Gardeners' Chronicle for August 30, 1845, we find the following method, by which, on three acres, to keep four cows all the year: "Plant one acre to potatoes—the produce should buy three tons of hay; equal, for November, December, January, February, and March, to ten pounds per cow each day. Plant one-fourth of an acre to mangel wurzel, one-fourth of an acre to carrots, and one-fourth of an acre to parsnips: the first will give you 25 pounds; the second, 15 pounds; and the third 30 pounds per cow, each, during the same time; but in feeding during winter you would need to keep the mangel wurzel untouched till March or April. This will more than provide for you during winter. For summer, sow one-fourth of an acre of rape, and one-fourth of rye, as

soon as you have dug that extent of your potatoes. These will be ready for March and April use; the ground on which they stand will come in for mangel wurzel and carrots. Your third acre may be planted—half of it to lucerne, and the other half may be sown to vetches, at successive sowings, in October, November, March, or April. These, with what may be left of the hay and mangel wurzel—and some of the latter will remain as late as June—will last you from April to October. You should cultivate all these with the spade, and your success will depend much upon your care and proper application of the manure." For this country very probably the above might need modifications.

A mode of raising corn, potatoes, and pumpkins in alternate rows, is thus described in the American Agriculturist, by one of its correspondents: "Mr. Muir, of this town, gave me an interesting account of an experiment made by himself in 1837, in planting one acre of land with corn, potatoes, and pumpkins, which was as follows: The land was ploughed from six to eigtht inches deep, well harrowed, and a light coat of manure spread on, and harrowed in well. The land furrowed lightly 2½ feet apart, and planted one row of corn, and the next potatoes, alternating them to the sixth row, which he planted with pumpkins. Thus every other row being corn and potatoes, except the sixth row, which was pumpkins, throughout the field. The corn in the rows stood only one stalk in a place, in this manner: 6 14 8 16 6. One cornstalk, and then a space of six or eight inches to another; then a space of 14 to 16 inches. The potatoes and pumpkins were planted as thick as they would bear, but he did not describe the manner. The amount of produce from the acre was as follows: 187 bushels of corn in the ear; 153 bushels of potatoes; and 100 cartloads of West India pumpkins. He has since followed a similar course, and is satisfied that this is the best way for him to get the most profit from his land.—E. P., *Essex county*, *N. Y.*, *March* 25, 1845."

Some other useful remarks on the subjects of cultivation in general may be found in our appendix No. 29.

SURPLUS, AND MARKETS.

In some of the States the amount of provisions raised on their own soil is not sufficient for the consumption of their population, and they of course must depend on others to supply them. But they, in their turn, have products of various kinds to give in exchange. This creates a brisk domestic trade, the results of which are seen all along our coast, on our inland seas and the different rivers, canals, and railways connecting the various points of commerce in our land. The surplus, too, seeks an outlet abroad, and becomes our medium of commerce abroad. It is unnecessary to attempt to trace out its courses. We refer to the appendix, Nos. 31, 32, for a number of tables, &c., which will illustrate the relation of our agricultural products to our foreign trade. We add here a few items which may be useful, as showing the amount of our resources, which we have taken from different public journals:

"*The exports of Ohio for* 1845.—The Cincinnati Chronicle says: We have before us the shipments from Cleveland, Ohio, and Cincinnati, for the year 1845, to the last week. As the season is nearly closed, we can give a tolerably accurate view of the exports of 1845 from this great agricultural State. It must be remembered that, in estimating the exports of a year, commencing the 1st of January, we do not get precisely one season's pro-

duction, but only one season's transportation. The production belongs to both—to the last and the present season. The shipments of the surplus of flour this year will be very nearly as follows, reducing the wheat to its equivalent in flour:

"Cleveland, 450,000 barrels; Cincinnati, 150,000; Toledo, 100,000; Milan, Sandusky, &c., 150,000; Marietta, &c., 40,000; Portsmouth, &c., 30,000. Total, 930,000 barrels. The other articles we estimate in money, thus: Flour, in all 930,000 barrels, $4,000,000; pork, in all $3,500,000; cattle and beef, $500,000; wool, (2,000,000 pounds,) $500,000; cheese, (5,000,000 lbs.,) $300,000; manufactures, $3,000,000. Total, $11,800,000. We think these results are under-estimated, and that there are miscellaneous articles enough to make the net surplus in value $12,000,000. The flour product is $2,000,000 less than it would have been had the last two harvests of wheat been good ones."

The following exhibits the amount of grain and flour transported in 1845 on the different lines of the Pennsylvania improvements named:

	Flour, bbls.	Grain, bushels.
Chesapeake and Delaware canal - -	31,585	1,314,891
Tidewater canal - - - -	90,187	983,260
Columbia railroad - - - -	188,993	261,594
East division Pennsylvania canal - -	115,950	87,332
Schuylkill navigation - - - -	74,131	349,680
Total - - - - -	550,846	2,996,757

Comparative statement of the amount of flour and meal exported from Philadelphia during the last three years:

	Flour.	Rye flour.	Corn meal.
1845 - - -	200,642 bbls.	17,132 bbls.	413,195 bbls.
1844 - - -	296,433	21,903	101,236
1843 - - -	162,847	52,025	108,166

"From the Buffalo Commercial Advertiser.

"*Annual trade of the canal.*—By the established standard of valuation, on property arriving here, and on that seeking the seaboard, it is found that the interior, during the past year, has overdrawn her account; or, in other words, has the balance of trade largely against her. The class and valuation of property arriving and clearing by the canal, in 1845, has been as follows:

	Arriving.	Clearing.
Of the forest - - - - -	$77,895	$1,707,136
Agriculture - - - - -	146,566	7,060,545
Manufactures - - - -	1,207,510	400,853
Minerals - - - - -	59,259	820,494
Merchandise - - - -	15,134,014	44,278
Sundries - - - - -	263,048	
Total value - - -	$16,888,382	$9,502,306
Total tons - - - - -	144,413	243,673

Balance against the west in 1845, $7,386,076.

"The up and down freight by the canal at this place, its valuation, &c., for a series of years, has been to the annexed extent:

	Up freight.		Down freight.	
1840	78,261 tons	$9,996,696	130,465 tons	$5,512,326
1841	86,243	10,302,144	170,809	8,199,142
1842	76,747	8,009,330	174,030	6,884,156
1843	116,601	14,570,120	224,106	9,139,756
1844	139,520	15,965,000	243,086	8,840,030
1845	144,414	16,888,380	243,673	9,502,366

"A change in the classification of some commodities going east, renders explanation necessary. Heretofore butter and lard went forward as one item; and bacon, hams, &c., passed as pork, and were reduced to the barrel standard. This year they have been kept separate. The amount in bulk cleared for the Hudson this year was 1,218,810 pounds—equivalent to 6,000 barrels. So that, by adding this with the quantities of pork shipped this season, it leaves a deficit of 18,130 barrels, as compared with 1844. Hemp is now becoming quite an article in lake imports, and will hereafter pass freely towards tidewater for a market; but, as it is cleared at the canal office among sundries, we are unable to say what the quantity going east has been. The table below exhibits a full account of the canal business here for four seasons. Property shipped for tidewater;

	1842.	1843.	1844.	1845.
Flour—barrels	654,430	880,868	851,180	721,800
Pork, do	52,720	48,556	52,417	28,235
Beef, do	5,363	26,666	33,348	34,084
Ashes—casks	18,518	38,261	37,365	38,417
Wheat—bushels	1,128,120	1,699,724	1,768,105	1,354,996
Corn, do	273,410	207,806	119,530	33,094
Barley, do	2,832	11	55	none
Rye, do	2,080	2,832	2,550	903
Oats, do	161,430	22,100	8,230	9,040
Whiskey—gallons	378,340	198,830	69,352	272,336
Butter—pounds } Lard, do }	6,621,565	7,875,630	6,281,577	{ 3,397,690 (Butter) / 2,852,440 (Lard)
Cheese, do	2,976,170	2,901,778	2,304,827	2,579,920
Wool, do	592,730	1,249,544	2,643,148	3,441,317
Flaxseed, do	722,570	786,670	126,428	184,569
Clover & other—lbs.	1,409,500	2,660,794	3,248,488	2,487,336
Tobacco, "	994,520	1,779,500	210,150	608,850
Cotton, "	58,613	none	none	none
Lead— tons	727	791	63	173
Pig iron, do	17	8	26	81
Iron ware, do	12	44	39	17
Leather—pounds	106,580	108,930	362,460	1,090,548
Hops, do	17,750	23,735	22,030	4,436
Hides, do	250,500	not specified	379,320	769,860
Dried fruit, do	58,550	144,220	193,270	7,837
Staves—tons	17,491	17,274	30,758	44,587
Boards & scantling—M ft.	5,260	8,661	15,502	19,637

	1842.	1843.	1844.	1845.
Hemp—tons	omitted	134	omitted	omitted.
Coal, do	$1\frac{1}{2}$	1	8	977
Furs and peltries	–	242	181	273
Bacon—tons	as pork	as pork	as pork	609

"While the deficit of flour is equivalent to 215,000 barrels, we find a prodigious increase of wool and other important items. A fraction less than 400 tons of the former commodity is observable over the shipment for last season. Cheese was 200 tons more, and flaxseed has increased 1,080 bushels; while clover and other seeds have fallen off 13,580 bushels. Tobacco has increased some, but not enough to meet the bulk of 1842-'43. Butter and lard combined have fallen off 21,500 pounds. The increased demand for lead here has absorbed all the import from the west. The increase in leather is very great, and much of the surplus going east is from manufactories along the lakes. Nearly all the hops required for consumption are imported from the interior of this State, or places along the seaboard. The few hides passing east are designed mostly for manufacture in this State. The perversion in the movement of dried fruit is singular. Large quantities were imported from below last season to supply the demand here and along the whole lake country. The increased shipment of staves shows a gain of 50 per cent.; but, as the cargoes leaving here are always estimated below the actual aggregate, the real increase must be still greater. Lumber can be more accurately measured, and shows an increase of 33 per cent. Nearly the whole of our best shipping lumber, such as cherry, black walnut, white wood, and cabinet and chair stuff, generally, are the product of this State, obtained from the two western counties bordering on the lake. The pine is all from Canada. A portion of the pine used for building here is from our own State and Pennsylvania. The vast increase in the quantity of coal going east cannot fail to attract attention, and was formerly adverted to as being entirely owing to the opening of the Erie Extension canal into the bituminous region of Pennsylvania. The diminution in the article of corn is of such magnitude as to call for the especial consideration of the canal board. With millions of bushels lying uncalled for in the Scioto and Wabash valleys, a tariff of tolls is pertinaciously adhered to which entirely prohibits its being brought northward, to increase our trade and augment the State revenues. Other coarse and bulky articles might also be particularized, but the above catalogue embraces so many that it were loss of time in attempting a detail."

"From the Albany Citizen.

Flour—wheat—barley.—The closing of the canal enables us to lay before our readers the quantity, as near as we can estimate it, of the above articles, which have reached tidewater this season, with the estimated value of each article.

Flour.—We have estimated the value of the flour at $5 50 per barrel for the year 1845, which is probably a fair average for that article in New York. The estimated value in 1844 was $4 50 per barrel.

	Receipts.	Value.
1845 - - - - -	2,482,527 barrels,	$13,653,898
1844 - - - - -	2,222,204 do.	9,999,918
Increase - - -	260,323	$3,653,980

Wheat.—We have estimated the value of this article in New York at $1 25 per bushel for the year 1845. The estimated value in 1844 was 96 cents per bushel.

	Receipts.		Value.
1845 - - - -	1,604,112	bushels,	$2,005,140
1844 - - - -	1,262,249	do.	1,211,759
Increase - - -	341,863		$793,381

Reducing the wheat to flour at the rate of five bushels to the barrel, we have the following aggregates, in quantity and value, of these two important articles in breadstuffs:

	Receipts.		Value.
1845 - - - -	2,803,349	barrels,	$15,418,419
1844 - - - -	2,474,654	do.	11,135,943
Increase - - -	328,695		$4,282,943

Barley.—We have more difficulty in averaging the value of this article than of the other two. We have, however, placed it at 59 cents per bushel for both sorts, and taken the average from September 1st to the present time. The average of last year was 63 cents per bushel.

	Receipts.		Value.
1845 - - - -	1,144,114	bushels,	$675,027
1844 - - - -	818,472	do.	527,410
Increase - - -	325,642		$147,617

It should be borne in mind that the above receipts of barley are the reported receipts of bushels, as appear by the clearances at the collector's office. Each boat, however, probably measures out, on an average, 200 bushels more than appear on the clearance. Estimating accordingly, the actual receipts this year at tidewater would be about 1,232,114 bushels, and last year about 881,472 bushels. This would make the increase in bushels this year over last, 351,642, and in value $159,847.

The Telegraph, after stating that St. Louis exports 12,000,000 pounds of bacon and pork annually, claims that Alton exported last year nearly 5,000,000."

A considerable amount of western produce has doubtless been sent to Canada during the past season. According to the table of imperial duties on imports into Canada, with the added colonial duty, some of our products would have to pay the following duties:

	Imperial duty.	Colonial duty.	Total duty.	
Flour and wheat - -	2*s.* per barrel,	0*s.* 6*d.*	2*s.* 6*d.*	per barrel.
Other flour and meal -	free	2*s.*	2*s.*	
Barley, buckwheat, maize -	free	3*s.*	3*s.*	
Rye, beans, peas - -	_	_	3*s.*	per qr.
Hay, per ton - -	free	_	6*s.*	per ton.
Bacon, per cwt. - -	3*s.*	5*s.*	8*s.*	per cwt.
Butter - - -	8*s.*	2*s.*	10*s.*	per cwt.
Lard - - -	4*s.* per cwt.			
Cheese - - -	5*s.*	2*s.* 6*d.*	7*s.* 6*d.*	per cwt.
Hams - - -	3*s.*	5*s.*	8*s.*	per cwt.
Meats, salted or cured -	3*s.*	2*s.*	5*s.*	per cwt.

A table comprising other articles may be found in appendix No. 31.

The Canada crops, with the exception of hay, spring wheat, and in some parts potatoes, were all good. "The schedule of tolls to be levied on the Welland canal during the coming season, (1845,) has been published. Flour, per barrel, 5*d.* currency. Pork and beef, per barrel, 7½*d.* ditto. Wheat, Indian corn, barley, and rye, per bushel, 1⅓*d.* ditto."

As regards our foreign market, it is well known that the crops of grain and potatoes on the Continent and in England are short; and we are daily in expectation of the modification of the corn laws, if not of the opening of the ports. The ports have been opened in Belgium, and as regards some articles which before paid duty in some of the West India islands. A large quantity of flour, wheat, and other produce has gone to England. The circulars of Messrs. Fitzpatrick & Henry, in appendix No. 32, will show the prices and give other information as to the state of the market for our products. The following is published in one of the public journals, as showing the amount of our exports from the port of New York, compiled from the New York shipping and commercial list:

Statement of the exports from the port of New York, for the years 1843, 1844, and 1845:

	1843.	1844.	1845.
Apples, barrels	15,015	13,463	14,439
Ashes, pot, barrels	43,046	40,532	46,724
Ashes, pearl, barrels	2,584	9,706	9,567
Beef, pickled, barrels	36,048	61,648	55,552
Beef, dried, barrels	6,999	2,401	3,638
Beeswax, cwt.	7,154	6,387	4,595
Brandy, half pipes	189	988	208
Brandy, quarter casks	123	146	145
Butter, firkins	48,034	28,761	28,884
Cassia, cases	—	—	1,401
Cassia, mats	28,947	14,880	10,414
Candles, sperm, boxes	11,856	10,383	17,559
Candles, tallow, boxes	23,326	27,791	36,637
Cheese, casks	8,964	11,241	5,935
Cheese, boxes	62,112	77,173	113,698
Clover-seed, tierces	1,561	3,519	6,477
Cochineal, ceroons	118	52	311
Cochineal, bags	19,401	54,742	43,706
Coffee, casks and barrels	266	448	102
Cocoa, bags	13,071	7,304	5,637
Cordage, coils	2,559	3,805	3,999
Corn, bushels	51,301	242,886	304,292
Corn meal, hogsheads	6,084	3,959	6,298
Corn meal, barrels	28,715	32,691	26,352
Cotton, bales	164,354	325,460	262,445
Dom. cotton goods, bales and cases	30,435	21,939	22,323
Logwood, tons	7,014	7,817	9,694
Fustic, tons	1,281	779	1,145
Nicaragua, tons	196	121	179
Dry codfish, cwt.	40,559	42,653	36,694

	1843.	1844.	1845.
Mackerel, barrels - - -	3,859	2,276	4,485
Herring, barrels - - -	5,898	6,467	4,602
Flaxseed, tierces - - -	4,131	3,924	14,586
Flour, wheat, barrels - -	274,881	347,249	469,520
Flour, rye, barrels - - -	8,798	6,669	9,257
Gin, (foreign,) pipes - -	12	10	43
Gunpowder, kegs - - -	8,233	11,821	17,753
Hams and bacon, cwt. - -	8,235	9,481	5,095
Hides, number - - -	53,633	45,615	46,396
Hops, bales - - -	2,842	3,098	3,059
Indigo, cases - - -	41	37	17
Indigo, ceroons - - -	154	96	15
Lard, kegs - - - -	188,687	198,094	84,819
Lead, pigs - - - -	–	–	25,784
Shooks, (hogsheads and pipe,) No. -	23,759	29,322	35,844
Boards and plank, thousand feet -	4,748	5,689	9,188
Staves and heading, thousands -	3,239	4,619	7,365
Hoops - - - -	1,000	1,797	1,338
Shingles - - - -	1,761	2,423	2,200
Nails, casks - - -	9,248	7,857	8,797
Rosin, barrels - - -	82,844	105,225	99,950
Spirits turpentine, barrels - -	1,702	2,127	4,112
Tar, barrels - - -	35,374	26,049	31,983
Turpentine, barrels - -	202,049	207,908	237,252
Oil, olive, baskets and casks -	1,208	2,338	3,073
Oil, linseed, casks - - -	143	211	211
Oil, whale, gallons - - -	2,567,916	2,368,986	3,117,984
Oil, sperm, gallons - - -	472,363	389,332	900,244
Pepper, bags - - -	2,187	5,111	3,644
Pimento, bags - - -	5,247	3,305	9,333
Pork, barrels - - -	48,962	90,772	76,481
Rice, tierces - - -	28,100	23,628	23,922
Rum, (foreign,) puncheons - -	568	518	836
Rum, (American,) barrels - -	1,767	4,235	3,671
Saltpetre, bags - - -	1,339	38	2,751
Silks, packages - - -	659	1,023	1,666
Soap, boxes - - -	33,960	44,114	31,720
Gold, dollars - - -	385,889	1,375,526	1,047,670
Silver, dollars - - -	2,033,374	5,313,357	2,009,718
Sugar, Havana white - -	266	525	
Sugar, Havana brown - -	2,857	5,039	2,720
Sugar, Manilla, &c., bags - -	5,511		
Sugar, Muscovado, hogsheads -	343	1,227	9,153
Sugars, refined, cwt. - -	9,066	19,121	46,310
Tallow, casks - - -	9,665	11,827	7,410
Teas, Souchong and other bl'k, lbs.	64,652	133,256	229,482
Teas, hyson skin, lbs. - -	16,875	68,492	11,845
Teas, hyson and young hyson, lbs. -	179,462	263,772	553,824
Teas, gunpowder and imperial, lbs.	215,283	107,251	147,557
Tobacco, leaf, hogsheads - -	6,771	5,525	3,527
Tobacco, bales, &c. - -	12,989	8,150	7,706

	1843.	1844.	1845.
Tobacco, manufactured, kegs -	11,799	15,487	20,354
Whalebone, cwt. - - -	14,521	13,668	24,431
Wheat, bushels - - -	44,885	58,282	304,654
Whiskey, barrels - - -	70	736	1,038
Wool, bales - - -	64	106	3,120

Imports and exports of hides at New York.

	Imports.	Exports.
1843 - - - - - -	653,431	53,633
1844 - - - - - -	854,790	45,615
1845 - - - - - -	777,640	53,633

In appendix No. 32 will be found a variety of papers in relation to the foreign trade, and British exports, &c.

The question is one of much interest to our country whether we may not succeed in introducing our corn meal (of maize) into foreign countries; and it is believed that with care in kiln-drying, the object may be effected. The experiments of Mr. Gill referred to in the last two reports, and in Mr. Ellsworth's letter in the present one, (appendix No. 1,) seem decisive. Let but the thing be fairly tried, and it is believed that it will be highly esteemed abroad. An interesting paper on the corn meal trade may be found in the appendix No. 32. It relates principally to the West Indies, but shows that there is an open market there for our enterprise. The subject of corn meal, &c., suggests to us here to turn the attention of our farmers and planters to the universal eccentric mill, a description of which will be found in appendix No. 33.

The opinion has been held that were the British ports opened for wheat and flour, or were our corn meal to find favor there, we should still be unable to realize any peculiar advantage, as other counties would be ready to pour in their supplies, (more favorably situated as to distance and the price of labor,) so that we should be unable for these reasons to compete with them. This remains, however, to be seen. It is believed that notwithstanding these apparent advantages, our enterprise would find means to introduce large quantities of our products into these ports. The price of labor is indeed much lower; but the unexampled fertility of our lands and the industry of our farmers, stimulated by the prospect of a large market, would leave a much more abundant surplus to dispose of than any other country could furnish. Some effort has been made to collect statistics as to the price of wages in our country, both of mechanical labor and that of husbandmen; and so far as obtained, the statement will be found subjoined in appendix No. 34. It is stated that in the course of the past year some seizures of American cheese have taken place, owing to their being marked with the brands "English Dairy" and "Cheshire Cheese." The handling of cheese is said to be extremely rough at the English custom-houses; the boxes are broken open, each cheese is examined separately, and then tossed without care upon the ground, and often into the dirt; so that a writer in one of the agricultural journals says many fine cheeses are thus often ruined by the treatment they have to undergo. Any attempt to counterfeit English brands must have a tendency to render these evils still greater, as they are almost sure to be discovered by the methods which are adopted. The objection to

some of the articles exported from this country, from insufficient packing, &c., has in a degree been obviated. Considerable pains have been taken by extensive houses at the west; and we have seen it stated in one of the English agricultural journals that for this purpose packers, &c., have been sent out from Great Britain, well acquainted with all their most acceptable modes of preparing articles for the market. In addition to directions which have been heretofore given as to curing hams or bacon, we will subjoin one or two recipes which we have met with in established English journals. The following is from the London Agricultural Gazette, which is published with the Gardeners' Chronicle. The writer states that he has been accustomed to cure bacon for home consumption for many years. His directions are as follows: "As soon as the flitches are cut from the hog, lay them on a form or table in a slanting position; and, supposing the whole hog to have weighed 12 or 14 stone, take one-fourth pound of saltpetre, pounded very fine, and sprinkle it all over the flitches, rubbing it well into the shoulder parts especially; let them remain 12 hours, when they should be rubbed dry; and in the meantime mix seven pounds of salt with one and a quarter pound of coarse brown sugar, stiring it well, that it may all be of the same temperature. The mixture, as hot as the hand can possibly bear it, is now rubbed well into the flitches, which are put one upon the other, and laid into a salting pan or other contrivance, in order that the brine may form and be kept from waste. The bacon must be kept in this situation four weeks, turning it and basting it well with brine twice or thrice a week. At the expiration of this time take the bacon from the brine, hang it up to dry, and smoke it if preferred, which, in the absence of a regular smoke-house, may be done as follows: Hang up the bacon in a chimney or other orifice, then underneath put down a layer of dry straw; upon this a layer of mixed shavings, keeping out those from deal or fir; next a good layer of sawdust and some juniper-berries, or branches where procurable; and over all a mantle of wet straw or litter, which makes the fire give out much smoke, without burning away too rapidly. This smoking must be repeated three or four times, or until the bacon appears thoroughly dry, when it may be hung up in the kitchen or any dry place convenient."

A correspondent of the same paper gives the Yorkshire method. He says that after being killed, he allows it to hang 24 hours previous to its being cut up. He then rubs one pound of saltpetre on a pig 20 stone in weight, and with this 20 or 30 pounds of common salt, taking care to rub it well in; then it is laid in a tub kept for the purpose. After it has laid for a fortnight, it is turned over, and a little more salt (say 3½ pounds) applied; it then remains a fortnight longer in the pickle tub; it is then taken and hung up for two months in the kitchen to dry, unless winter is far advanced and dry weather set in, in which case a shorter period will answer. After being taken from the top of the kitchen the inside is washed over with quick-lime and water, to preserve it from the fly; it is then removed into a room not used, away from heat, and where it may be kept perfectly dry. The plan is, not to smoke at all; the salt and saltpetre must be of the best quality.

The Hampshire mode is thus described: "Let the hog be killed only in the morning, in a dry day, and when the wind is from the north, it having fasted the day before. Hang it up, when dressed, in some airy place for twenty-four hours, and then cut it up. Lay the flitches on the ground, and sprinkle them lightly with salt, and let them lie for six or eight hours;

then turn them up edgeways, and let the brine drain off. Take two or three gallons of the best salt and two ounces of saltpetre, pound them fine and mix them well together, and, on a salting bench of the best seasoned oak, salt them by rubbing in the salt on the backside of the flitch. Then turn the inside upwards, and lay on the salt about one quarter of an inch thick. Neither rubbing nor saltpetre should be used again, or it would make the lean bacon hard. Change and salt them every third day for six times, when the bacon will be salt enough. Then rub off all the stale, briny salt, and lay on each flitch a covering of clean, fresh bran or sawdust, and take it to the drying-loft. It should be hung there by means of crooks in the neck of the flitch, and remain for fourteen days. He recommends, for drying, cleft oak or ash."

The following is given in Costello's Tour, as the method of preparing the celebrated *jambon de Bastogne*, or Ardennes ham, which is pronounced by the tourist to be an incomparable dish for the epicure: "The ham is cured in a brine of salt, saltpetre, and aromatic herbs, viz: a few bay leaves, wild thyme, and a handful of juniper-berries and a little garlic. It is steeped for about six weeks, and then dried in the smoke of the chimney over a wood fire. When wanted for dressing, it is buried in the ground for twenty-four hours, and then boiled, with the addition of the same aromatic herbs in the water. After boiling, the bone is taken out, and the ham is pressed under a heavy weight. As a corollary to the dressing, it is added that the ham, when produced at table, disappears at one sitting."—*Mark Lane Express.*

Other methods of curing hams and beef, &c., will be found in appendix No. 35.

In the January number of the American Agriculturist, (1846.) we find an interesting account of an invention by Mr. Davison, for curing provisions, which promises to be of much advantage in many cases. The statement has so much engaged our attention, that we have transferred it to an appendix, (No. 35.) "The principle on which the method acts is that of a pressure upon the meat in a vacuum." The advantage is *rapid* curing. It may be done in twelve hours ready to pack, which is a great gain of time, storage, &c.; its juices will not be lost in brine; it may be cured in summer as well as winter. Thus less capital will be required at the west for the purchase of meat, as time, interest, storage, and insurance are saved. They can also begin to pack earlier. Meat that is skippered or tainted, it is said, can be saved and restored. Old hams and bacon that will not take pickle by immersion, by the vacuum process may be made to do so; meat *warm* may also be cured and packed at once; it can be made to keep in warm weather, &c. Another application of the method, it is said, may be made to impregnate wood, &c., with salt. The apparatus employed, it is likewise stated, is an extremely simple and economical one. It is not improbable that our articles of provisions have, in many instances, suffered in foreign markets, owing to the poorness of the salt with which they are prepared. Much of the salt made in this country, and also the Liverpool salt, contains impurities which injure its fitness for the purpose of complete preservation. It is not to be doubted that what is prepared by the solar process, or which is called the solar salt, may be fully equal to any other; but it is said that this bears a small proportion to the whole manufactured. The analyses that have been published show a wide difference in regard to saline qualities in this kind of domestic and other descriptions of home

manufacture. Now it is well known that butter requires the best of salt, and it is often injured by want of care in that respect. The committee of Addison county, Vermont, in their remarks, say that none but the best Turk's Island (not even Liverpool blown salt) will answer for this important purpose. The same objection lies against many of our salts as to using them for curing pork, beef, &c. The longer there is want of care or attention on this subject, the longer will our provisions be subject to depreciation abroad. The best economy, therefore, is undoubtedly to use the best article, as this will insure the best prices.

We have thus taken as full view of the crops as in our power, with the means at our command, adding also various other kindred subjects, as seemed appropriate. Many may, no doubt, dissent from some of the estimates we have made, and will believe that they can form conjectures nearer the truth. We do not deny such a possibility, and shall not attempt any dispute with their fancied superiority. If more correct, we shall be glad that our countrymen may be benefited by their deductions. What has been attempted and done has been in all honesty of purpose, and in the hope that our farmers and planters will not esteem the effort altogether fruitless. But before we close, we trust it may not be unfitting to look for a moment or two at some considerations bearing on our future agricultural prospects.

FUTURE AGRICULTURAL IMPROVEMENT.

There are some things which seem to authorize our augury of still greater advances in agricultural improvement. And in touching on these, we shall, at the same time, suggest the points of deficiency which still remain to be supplied.

The first ground of encouragement on which we rely, then, is, *increasing agricultural knowledge.* To any one who will take the pains to examine the list of agricultural periodicals, and compare it with that which would comprehend all the weekly or monthly journals of this description a few years since, the contrast will appear striking. Nor is it only in the number of these, and the wider extent of publication and circulation which is enjoyed by them, that this difference is manifest. They are not merely printed in more sections of our country, but they are much superior in their appearance and their contents; to say nothing of the beautiful and highly finished illustrations which make a part of them. Instead of being confined to results at home, they are filled with letters from able correspondents abroad, as well as condensed views and extracts from foreign works of high reputation. We have thought it might not be an uninteresting addition to our appendix to subjoin a list of our agricultural periodicals, and such will accordingly be found in appendix No. 36. These weeklies and monthlies having more or less extended circulation, exert a very important influence on the public mind, and thus a direction has been given to the public feeling. The effect of this, and the impulse which has been given, are seen in the various channels which are every where open to meet the craving for greater supply. The editors of many of our public journals have discovered that mere political intelligence, or scraps of literary intelligence and wit, are not all that are demanded from them by the yeomanry of our country. There must be an agricultural department, or a column, at least, devoted to agriculture, to secure the patronage of the farmer subscriber; and, accordingly, there are not a few of our political journals which

weekly furnish articles, selected or original, on subjects connected with this great branch of American industry.

Another means of diffusing such knowledge, is the publication of volumes of standard merit relating to agriculture. We think it truly an auspicious era in our country, when such works as Thaer's, Liebig's, Johnston's, Mulder's, Petzholdt's, Youatt's, Dana's, and many more—too long a list to name here—are brought within the reach of our agriculturists. If they do not at once give up former views, and adopt those which accord both with science and experiment, yet we can hardly doubt that in many cases these will exert a modifying influence on their practice. Gradually they may be led to feel the importance of such things, and another generation, if not the present, will be found to be imbued with correct principles of agricultural science.

The brilliant success which has attended recent demonstrations on the part of the well-trained and thoroughly disciplined minds who led the way in the reformation of agricultural chemistry and vegetable and animal physiology in their applications to practical use, has prompted new aspirants to fit themselves thoroughly to share in the nicer discriminations and new discoveries yet to be made.

We hail it as a cheering promise in this respect, that there are minds of enlarged views and accurate investigation abroad among us, and operating on the most intelligent of our agricultural population. These authors, whether of our own or of other countries, are only the precursors of a constantly increasing agricultural literature, which is destined to render more efficient the means at our command for covering our land with smiling fields and waving harvests, so that literally the wilderness may yet "bud and blossom as the rose." The increased training of the youthful mind agriculturally, is also another feature which augurs well for us. We refer here to elementary treatises adapted to the young, to the establishment of agricultural schools, and to the proposed introduction, in a degree, of some of these topics in our common schools. There is much not merely to expand and invigorate, but also to interest the mind, in agriculture, studied in its bearings on various sciences. Chemistry, with its beautiful illustrations of combination or decomposition; geology, with its marvellous and time worn relics of past ages; entomology, and its curious developments; together with the mysteries of animal economy, vegetable physiology or botany—all are made to open their treasures and present their attractive claims. The young student is brought thus to a world of wonders; and his attention once arrested, he cannot but find that agricultural study, in the broad view which should be taken of its domain, has sufficient to amuse and to discipline the faculties of intellect and heart. Its influence can scarcely fail to be salutary, as it leads him to the great laboratory of nature, and shows him how the operations of Providence keep at work the means of supply, and that decay is only succeeded by reproduction in some other form of vegetable life. It is scarcely necessary to say that, with these inspirations of science, he will be the promoter and patron of improvement in every shape, and that he will be foremost in upholding the agricultural club, the county or State association, with its fairs for exhibition of products of industry. These, too, the more they are multiplied, will exert a wider influence. Our countrymen are apt to observe and to invent; but they need more precision and discipline in the development of their operations. As these are acquired by a severe training in science, the results

will be seen in a thousand ways. We point to one desirable improvement which, if it were accomplished, would doubtless exercise no little influence on our agricultural prospects. We refer to the adoption of some such course as is taken in the great agricultural meetings in various countries of Europe, where a week is spent by persons brought from all parts in discussing subjects of agriculture, previously arranged in a printed programme. Some idea of what we mean may be gathered from the perusal of Mr. Fleischmann's letter, and also the translation of the regulations relating to the great agricultural meeting at Breslau last summer. (See appendix No. 37.) It is true that something of the same kind on a small scale has been attempted at Albany, Boston, New York, and other places, during the sitting of the State legislature, or weekly, and we see not why the object might not be attempted and executed successfully on a much larger scale in our own country. A paper on subjects of discussion, with reference to works on agriculture, which we have taken from the London Gardeners' Chronicle, will be found in appendix No. 37.

Another ground on which we rest our augury of prospective improvement in this great branch of national industry is *the application, in new forms of enterprise, of the products of the soil, and of the departments of collateral husbandry.* To take a single instance for illustration. It is but a few years since the improvements were introduced by which such quantities of lard and lard oil are prepared for the market. The business connected with this has already run out into varied channels, and so it must be with every new invention which appropriates the fruits of the farmer's toil. One branch of labor gives rise to yet another. But our career in this respect seems but just begun. The vast increase of inventions, the numerous shapes through which industry is developed, all furnish reason to believe that we have by no means reached the end of our progress. The enlargement of these outlets of skill and enterprise, and the prospect of increased civilization through our commerce abroad, will undoubtedly have a tendency to make our land teem with an industrious population, whose wants will multiply as their wealth shall increase; and thus, through the diversified reciprocities of trade at home and abroad, a more steady and reliable market be created, which shall help to enrich the diligent and reward the efforts of successful economy. It will not be long, as we confidently believe, before an average uniform price at points equidistant from the great marts of commerce will be established throughout our land by means of telegraphic communication, and the facilities of conveyance be so multiplied as to check the inequalities induced by speculation, and give assurance that they who provide by the sweat of their brow for an extending empire of freedom, shall not labor in vain. If affluence may not be the lot of all, yet steady prices, on which they may count, will aid the contented and industrious spirit to enjoy the comforts and many of the luxuries of life, of which others in the same employment and occupation in foreign countries are so greatly in need. (Charcoal roads are suggested as valuable in some of the States. See appendix No. 38.)

From considerations like these, (and others, too, might be mentioned,) if we are not mistaken, there is ground for cheering augury of agricultural improvement, which, though its progress may be gradual, will yet be certain and permanent, as well as productive of happy effects on our country and the world. That there is a rising feeling in favor of agriculture, the ten thousand voices echoing back from every quarter to us, in approbation

of the humble efforts made from year to year in collecting, and, through their own representatives, laying before our farmers and planters the information of various kinds within our reach, abundantly testifies. We might, likewise, refer to the embodiment of this feeling in resolutions at the farmers' convention, (see account of this meeting, appendix No. 39,) urging the importance of their claims to regard, and as it meets us stronger and stronger from year to year in the agricultural journals in all parts of the country. Never was there a fairer time to aid its development. Without resorting to more questionable means, which might rather injure than benefit, it lies in the power of those who occupy places of influence to lend a warm-hearted co-operation to every effort of improvement, and to diffuse as much as possible a generous spirit of enterprise into all the branches of agricultural industry. We indulge, we are sure, in no fancied dreams when we say that the past years have only been the harbinger of a more perfect agricultural economy. It is with presages like these, while we see our bounds enlarged, we watch every indication of the awakening of the mind of our country to the importance of true science and practical knowledge. It is matter of gratulation to learn that a new agricultural journal has made its appearance, like a star first breaking through the darkness, in any section of our land which, till recently, could furnish no such proof of advancing knowledge. The information that a successful experiment, too, has added another name to the list of our products, or that the introduction of some choice specimen, either animal or vegetable, has brought to the agriculturists of those States the means of yet greater progress in improvement, is read with the confident expectation that another impulse has been given to the energies of industry, the results of which after ages will record with grateful satisfaction. Compared to the whole, each individual enterprise is but as a pebble dropped into the wide waters; but as even that slight motion agitates the nearest surface, and one wave after another spreads silently on, yet further and further from the place where it begun; so the community, in increasing circles, will feel the effect of every such event. One and another will follow on—a township, a county, a State, and yet larger portions of our country will in turn welcome the stranger, till it shall have made itself a home, and become domesticated and acclimated among our products.

Esto perpetua! is the prayer of every patriot as he casts his eye over our land of varied clime, and soil, and product, and people. With no stinted hand have the gifts of a kind Providence been strewn around us. The earth and its increase—flowers, fruits, animal, bee, worm, and fowl—all bear their tribute to supply our wants; and so profuse are the means of sustenance and comfort, that every year, almost, only serves to lap us in greater plenty. It is to agriculture—

> "The art that calls the harvests forth,
> And feeds expectant nations"—

we must look as the oldest employment, and the most necessary occupation of man. Honored, it will make our country glorious in the true strength of a nation—its virtue, intelligence, and enterprise. Neglected, the arm of prosperity will be shattered, and our experiment may end in doubt and dismay.

APPENDIX.

No. 1.

Letter from the Hon. H. L. Ellsworth.

WASHINGTON CITY, *January* 1, 1846.

DEAR SIR: Since my resignation of the office of Commissioner of Patents, I have availed myself of the opportunity to revise some of the estimates of my former report, especially those of the population of the United States. Though one of the data I had for my guide was the census published by government, a comparative increase, as exhibited by the ratio of the last ten years previous, was the basis of the population given. Several of the States, however, have lately taken an enumeration of their respective inhabitants, and thus afforded safer data in part. A personal revision of the computation, directed while in office, and which I had not time to examine, has also enabled me to correct important errors; and I have now to request that you will publish in your forthcoming report the estimates which I have, with no little labor and correspondence, prepared. Since my connexion with the office terminated, I have prosecuted several inquiries, principally on agricultural subjects, commenced soon after the transmission of my last report to Congress. The result may, perhaps, interest those who have expressed an approbation of the agricultural statistics emanating from the Patent Office. I have, too, had an opportunity to reduce some of my theories to practice, and it may be gratifying to hear of my success. Together, therefore, with a corrected estimate of the population of the United States, I submit an improved method of cultivating the prairie lands, in the hope that government will thus be benefited in making sales of territory now deemed of comparatively little value, on account of the scarcity of timber, and that individuals may be encouraged to make improvements to better advantage. Other matters, also, are subjoined, viz: an account of an improved method of preparing flour and Indian meal for exportation or for private use, whenever it is an object to guard against the evils of fermentation; the particular directions as to the preparation of hemp for market, (with the comparative value and expense,) as practised by Mr. Billings, and transmitted by him to me at Lafayette; the suggestions of Mr. E. G. Kelly on the subject of bees—more important as coming from a practical man—showing how to obtain pure honey, to produce artificial swarms, prevent robbing and the ravages of the moth; directions for the construction of hotbeds, offering a substitute of canvass for glass, a desideratum both in economy and greater benefit to plants; (and having examined some beds lately constructed, I consider the improvement important.) In former reports the culture of mustard was recommended, and the successful efforts of Mr. Parmalee, of Ohio, mentioned. It has not been until lately that I have been able to obtain from that gentleman those particulars which I desired. I am now able to transmit to you the most full information on the subject, and do not hesitate to recommend this crop whenever

labor can be found for thorough cultivation. There is another subject highly interesting to the citizens of the United States—the supply of oil for burning. The great leviathans of the deep are fast disappearing, and are even now found most successfully amidst the ice near the poles. An interruption of commerce may prevent this traffic. Napoleon, who was so pre-eminently careful in providing for the contingencies of war, spared no efforts to obtain a substitute for oil from the sea, and encouraged the culture of rape, colza, and other oleagenous seeds. It is worthy of remark, that, at the present time, the light-houses and other public works in France are lighted by the oil obtained from colza; and it is found that this oil is the best substitute for sperm oil, being so pure as to burn well in the most improved French lamps. Through the kindness of Mr. J. W. P. Lewis, civil engineer, so favorably known for his thorough investigation of the subject of lighting the coast and the harbors, I have been able to obtain from France seed of both the summer and winter colza, which I have the pleasure to place at your disposal, accompanied by a translation, by the same scientific gentleman, of the mode of its culture and manufacture, from a work by a distinguished scholar and philanthropist, M. Hotton. Although now separated from the bureau so long intrusted to my superintendence, be assured my desire for its prosperity has not diminished, and I ardently desire and hope that you may find in Congress a continued willingness to provide the means of extending its greater usefulness under your administration.

Yours, very respectfully,

HENRY L. ELLSWORTH.

Hon. EDMUND BURKE,
Commissioner of Patents.

An estimate of the population of the United States—January, 1846.

Maine	575,500
New Hampshire	291,500
Massachusetts	817,000
Rhode Island	120,000
Connecticut	320,000
Vermont	298,000
New York	2,626,000
New Jersey	409,000
Pennsylvania	1,960,000
Delaware	79,000
Maryland	485,500
Virginia	1,255,000
North Carolina	760,000
South Carolina	600,000
Georgia	784,000
Alabama	660,000
Mississippi	586,000
Louisiana	440,000
Tennessee	910,000
Kentucky	835,000
Ohio	1,760,000

Indiana	860,000
Illinois	722,000
Missouri	540,000
Arkansas	140,000
Michigan	320,000
Florida	80,000
Wisconsin	100,000
Iowa	115,000
Texas	100,000
District of Columbia	54,000
	19,602,500

CULTIVATION OF PRAIRIE LAND, &c.

The vast amount of prairie land owned by the United States, although rich and fertile, remains still uncultivated, and will continue so until the expense of fencing is reduced. Some persons that have entered this kind of land already meet great embarrassments; while others, that have adopted the modern improvements, rejoice that they have escaped the toil and expense of clearing off timber, when the land was covered with wood. In my former reports, as Commissioner of Patents, I have frequently alluded to this subject, and offered many suggestions for the consideration of others. Since leaving the Patent Office, I have been enabled to reduce my theory to practice, and will give you a detail of operations which have proved successful. In *breaking up the prairie*, five good yoke of cattle are necessary, if the large breaking plough is used. This team may be composed of two yoke of old well-broken cattle, and three yoke of unbroken steers, and will break from $1\frac{1}{2}$ to $2\frac{1}{4}$ acres per day, according to the weather. It may seem surprising that only one man or boy is necessary, viz: a driver for each team. No person holds the plough. I have had seven ploughs at work during much of the summer, and the plough, as is said, "holds itself." This novel sight attracted the attention of travellers, who often alighted to see how the work was performed. The arrangement to effect this was simple. Two small wheels, made of plank, with a short axle, were placed in front at the extremity of the beam, which was fastened so as to keep the plough erect, to govern the depth of the furrow, as well as the width of the same. Sometimes both wheels are made to run upon the turf; it is better, however, to make the wheel of the furrow about 8 inches in diameter, the largest; (this will keep the axle sufficiently level.) The seven teams, which were driven by youths 14 to 16 years old, required one judicious man to keep the ploughs in order, for sometimes they would come in contact with stones, and roots, almost as bad; and, in all cases, the ploughs often need sharpening, which is done by either hammering or filing the share. The usual price for breaking up prairie land, near my residence, is $1 50 per acre. This work can be done much cheaper, however, by hiring a man at $18 per month, or $16, he boarding himself; since the team is supported on the prairie, and there is little extra expense, except the repairing of the plough. Another mode has lately been adopted in breaking up the prairie, viz: with a single span of horses. To accomplish this, a coulter, with a

share six to eight inches wide, is first passed through the sod; this, it is perceived, must cut vertically, and also horizontally, as far as is necessary, it being desirable not to cut the whole distance of the furrow, since the remaining operation requires a part of the sod nearest the furrow to remain solid. The second operation is the running of a common plough, with a sharp share, (with or without a coulter,) in the same track. The only obstacle to its easy passage is the outer edge of the furrow of a few inches; this is cut or broken, and the furrow easily turned over. This plough will enable a settler, if the land is ploughed in the spring, being then much less compact, to break up, with his span of horses, $1\frac{1}{2}$ acre per day.

There has been much diversity of opinion as to the depth of the furrow, and the proper time of breaking up. From three and a half to four inches is sufficiently deep; the turf sooner decomposes if it is cut shallow rather than deep; then the lower roots decay rapidly, and in a few months the tough rigid soil, that requires five yoke of cattle to break it, is easily ploughed six to seven inches deep with a pair of horses. As to the first time of breaking, if the sod has been tramped, blue grass springs up, and the roots of original sward begin to perish, and it is of less consequence when such sod is broken. As respects original tough prairie sod, this should not be ploughed until the grass has fairly started, say in May or June, and July; if broken up much earlier than May or later than July, the sod does not decay so soon. It is usual throughout the west to break up the sod during these months, and sometimes even later; and in September and October to harrow in the wheat for the first crop. Another mode I have, in common with some others, pursued with great success, viz: to raise a "sod crop." This process to eastern farmers needs explanation. In every third or fourth furrow corn is dropped at the outer side of the furrow, computing from the land side. This is buried up by the succeeding furrow, and the corn springs up through the partial crevice; and if perchance the sod lies flat upon the corn, it will generally in its growth force its way through the solid turf, strange as it may seem. The land thus ploughed is remarkably free from weeds, and the corn in ordinary seasons grows rapidly. No hoeing is needed, and nothing is done to the crops until the time of gathering arrives, when often from thirty to sixty bushels of good corn is obtained. The cost of dropping the corn is ten cents per acre; one small boy attends three ploughs. My sod crop this year was not so great as that of some of my neighbors, who chose a more propitious moment for planting. From one hundred acres, however, I estimate my crops at an average of thirty bushels of shelled corn per acre; some raised as high as sixty bushels of sod corn, being the full amount of the yield of corn commonly tilled on good soil. My friends from the east were greatly surprised at finding a crop of three thousand bushels of corn from one hundred acres of land, without tillage. This sod crop may be considered almost clear gain, since the shade afforded by the growing corn is rather beneficial than injurious to the decay of the sod for a wheat crop in the fall. For if the sod crop is put in early, it can be cut off in the fall in sufficient time to harrow in a crop of wheat; this is done without any further ploughing, and gives generally the largest and best wheat crop raised on the land. It is thus seen how easily a settler can supply himself with food for his family in a new home at the west. While passing through the fields near my own, I was struck with the culture of beans planted in the same manner as sod corn; and these grew also without any subsequent cultivation, and yielded a good

crop. Nor was my attention less arrested by a crop of corn and beans growing together, the stalks of corn serving as poles; all were planted together in common ground. The extraordinary product induced me to inquire for the owner of the field, and I found him to be an intelligent farmer, Mr. McAllister, who said he had tried the same thing with like success before, with no hoeing, barely ploughing. He thought he should get eighty bushels of corn and thirty bushels of beans per acre. I requested him to measure the ground and the crop, and give me the result in the fall. He did so, and his certificate, to which he is ready to make oath, is now on file in my office. His product, by his statement, was one hundred bushels of shelled corn and fifty bushels of beans per acre! From the small quantity of land measured, and the most favorable manner of enclosing within his lines the hills of corn, I have made a liberal allowance, and place the crop with certainty at eighty bushels of corn and thirty-five bushels of beans per acre; and all this without hoeing or any other culture than the passing the plough or harrow three or four times between the rows. It may appear to be rather slovenly to omit hoeing, but such is the practice. On one of my plantations, in which are one thousand acres in cultivation, I have not seen a hoe used during the summer. I think more care and attention would be rewarded; still the land yields upon an average fifty bushels per acre, annually, without hoeing or manure. I was offered sixteen bushels of corn as rent, per acre, instead of one-third of the crop, which is the usual share for the landlord. I preferred, however, the one-third, and got twenty bushels; the season being very favorable, and the land yielding sixty bushels and some as high as eighty bushels per acre; fifty bushels, however, is a good crop; and when the hazards of the season are considered, sixteen bushels per acre may be called a good rent. With this conviction I have rented one thousand acres of ground for sixteen thousand bushels of shelled corn delivered in the crib.

While corn is so easily raised, it may be asked, what is its value? At present, the price at Lafayette is about 20 to 25 cents for exportation to New York *via* the lakes, the Wabash and Erie canal, or to New Orleans *via* the Wabash, Ohio, and Mississippi rivers. Considerable shipments are also made to Canada. It is hoped that the State of New York will further reduce the tolls on her canal so as to insure an outlet for the corn and oats raised in the western States. At present these articles of produce are not shipped through that channel. If the tolls were reduced, a larger traffic (which would be clear gain to the canal) would be obtained, and also full freight for the boats in the "slack season." If the corn is fed out to cattle or hogs, (for beef and pork,) at present prices it is worth from 20 to 25 cts. per bushel. In the mode of feeding corn there is a diversity of practice; some graziers turn both cattle and hogs into the field of corn, to consume what they wish. Care must be taken, with regard to cattle, by letting them remain only a short time each day, at first. The fat cattle and fat hogs are first admitted, and follow each other; next the store cattle and store hogs. Nor is there so much loss sustained unless the weather is very wet, as might be supposed. Hogs will not pull down corn faster than they wish to eat it. Cattle do more injury; yet the hungry hogs will glean up most that falls on the ground. Both cattle and hogs consume, also, much of the succulent stalk, and the operation of this mode of feeding enriches, as may be supposed, the soil for a succeeding crop. I have serious doubts which is the most advisable mode: whether to cut up the corn and feed it to stock in pens,

or to let them consume it on the hill where it grows. Much will depend upon the division fences, the size of the field, and the advantage of water. Where these are adventitious, and labor not plenty, it is best to turn in stock, especially hogs. The usual mode, however, is to cut up the corn, stack it, and feed it out. This is necessary for stall-feeding, in winter, in order to save the fodder, so greatly injured by the frost. I have been able to hire land, tilled with a corn crop, at $2 50 to $3 per acre; the average yield being 50 bushels. The cost per bushel, standing in the field, is about 5 to 6 cents only, exclusive of the rent of the land. Several farmers have fattened the past summer as many as 1,500 hogs, and made most excellent pork. One and two hundred are considered an ordinary number. Hogs are usually killed at about 18 months' old, and weigh from 200 to 300 lbs.; they are fed on clover during the summer, and are suffered to run in the woods; in winter, if the mast is favorable, they live in the timber; if not, they are fed with a few ears of corn each. A preferable mode is to keep them better, and kill them earlier; the pork is finer, and commands a higher price in foreign markets. At the east it is no uncommon thing for spring shoats to weigh, at Christmas, 300 lbs. Having noticed in the papers an account of an extraordinary pig, raised by Mr. Wm. Moore, of Peterborough, New Hampshire, and which weighed 622 lbs. at 10 months and 15 days' old, I wrote to ascertain the fact. They are given in his letter, marked AA. I intend trying an experiment with a hundred pigs, taking care to weigh the food they consume, feeding them with slop or cooked food, and will note the result. I have no hesitation in recommending the following method as safe and profitable, viz: Clover for the early part of summer; next, rye fields and oat fields, (if peas are sowed with oats, the better;) and the cornfield to close. If an early kind of corn should be planted to use first, it would be well. In all such cases the hogs are to be their own harvesters. This plan keeps up a vigorous growth, and prepares the hogs for an early market—two important considerations.

There is much encouragement for the western farmers, and the reduction on the tolls, occasioned by the competition on the same and different routes, will make the encouragement greater still. Pork, it will be admitted, is very easily raised. We are now enabled to contract for its delivery in barrels, via the canals, from Lafayette to New York, for $12 50 per ton, or five-eighths of a cent per pound. It may be asked if this rich soil will not soon be exhausted? It had been supposed that it must, but large fields have been cultivated this year, (being the sixteenth year in corn,) and yielded 50 bushels per acre. There is, however, a gradual diminution of the quantity, and hereafter the farmers will be willing to save manure, which is now thrown away. I was surprised to find hundreds of loads, carted at an expense of 12½ to 20 cents, and thrown into the river to get it out of the way. Such still continues to be the practice in Lafayette, where the population is upwards of 3,000.

The machine for husking and shelling corn, at the same time, deserves mention as a great auxiliary in preparing the crop for market. When propelled by any power equal to four horses, it will husk and shell five hundred bushels daily.

I might here mention a new kind of corn lately introduced, viz: the yellow Dent corn, the ear of which is very long, and the color preferred for meal and for shipment. Its yield has been 125 bushels per acre. I take pleasure in sending you two ears—one for the gallery, and one for

distribution. I shall give the same a full trial during the summer. The samples I obtained at Indianapolis.

I have mentioned in particular the corn crop. The wheat crop is, however, the crop for exportation; 500,000 bushels of wheat will be shipped from the late harvest about Lafayette. This crop has been unusually good the last year, and the yield from 15 to 25 bushels per acre. A remarkable circumstance occurred in my wheat field, where several varieties were sown. The red-chaft bald wheat was attacked by the army-worm, and the stalks completely stripped. When the worms reached the white flint wheat, obtained of Mr. Harmon, of Wheatfield, N. Y., *they stopped, and went around the piece without touching a single stalk!* The attack did not essentially injure the berry of the bald wheat, on account of the lateness in which it took place. Potatoes, also, were good, but the crop is not so great as usual. The disease so much complained of has not yet reached us, but I expect it along very soon. It seems to be commissioned to go through the world, and yet defies us to explain its origin or find a cure.

I cannot omit to mention the important results which have attended my former recommendation of salting cattle and hogs, with a composition of salt, ashes, and clay. You may recollect that I advised to take water saturated with salt and mix it with two parts of dry ashes and one part of dry clay, and when the whole was brought to the consistence of clay mortar, to mould it into a pyramid shape and suffer it to harden, and then put it into the field where stock could lick it at pleasure. This experiment has been fully tested, and herds together, hitherto afflicted with the bloody murrain, have been exempt from any further attack. The clay is not, I suppose, so material. Ashes and salt in equal quantities, mixed, if convenient, with bran, may be given to cattle, horses, sheep, and even hogs, once or even twice a week, with the most happy results. The solid cakes, however, allow the feeble stock to obtain their share; indeed, this plan gives to *all as much as they desire*, and *at the time* they desire it. Sheep will usually lick the cake every day.

In bringing the land into tame grass pasture, it is found necessary to scatter blue-grass seed, which, being tramped in, soon yields a great supply for summer and winter food; for if the cattle were taken off from the blue-grass pastures in May, and the field is left to grow up until fall, they will survive and keep in good order upon it during winter, without any other attention than salting; if the grass is covered with snow only, cattle will paw off the same until they reach the relished food. As for sheds, they are, as yet, unknown; no large feeder has them, to my knowledge, in Indiana. It is said that so much shed room is required, that it will not pay. Hence cattle are stuffed with corn, and remain in the open air during all kinds of weather. I am satisfied, however, that the time will soon come when shelter will be acknowledged to be a great saving. At present, farming is done upon a great and easy scale, and little, very little, attention is given to economy; and what is real economy in the present state of the fertile west, where land and stock are so plenty, is not quite certain. I will only add, on this point, that the cattle are pastured upon the unenclosed prairies during the summer and fall months, without any expense other than salting. On these pastures they are in fine condition for the shambles or for stall feeding. For the latter purpose, they are now taken to Ohio and Pennsylvania by graziers, who improve them, and drive them

to the eastern markets. Cattle direct from the prairie are now packed in great quantities for the European markets. Shipments during the past year have encouraged larger exports this year; and if the beef sent will not find admittance into England for home consumption, it will be received in bond, for supplies to ships outward bound.

You might have expected that I should have mentioned *fencing* land, before I gave you an account of its cultivation. The order is of little consequence, provided you have the substance. I cannot but hope and believe that my experience in fencing the prairies will be useful to individuals, and help the government to sell its vast tracts of land now lying waste because there is no timber to fence them. Happily, on many of the great prairies (such is the case in the section where I reside) bituminous coal of an excellent quality is found, sufficient for domestic use. Timber is scarce; and to practise economy in this respect, I have recommended and adopted the following plan with success: On the line for the fence, holes are dug or bored about 1 foot deep to receive the posts designed to hold the rails. The post is bored for three, four, or five rails, with a $2\frac{1}{2}$ inch auger, moved by a single horse power. Two contiguous holes give a mortise $2\frac{1}{2}$ by 5 inches. One man will bore the posts for one-half to three-fourths of a mile of fence per day. For a fence for cattle only 3 inches are used. For hogs a small rail is added at the bottom; but this is covered up to secure a barrier against the rooting of the hogs before the bank becomes solid. The rails, when set, are about 12 to 18 inches above the surface of the ground. This distance is filled by a plough and scraper, described in my reports while Commissioner of Patents. As this may fall into hands where these reports cannot be had, I will repeat that a large plough is passed on each side of the fence, turning the furrow towards it. This is followed by a very simple machine, made of two planks, resembling in general appearance a snow-plough, though in detail constructed differently. The land side which follows after the plough (by another team) is, say 15 feet long, 3 inches thick, and a mould board 15 inches wide is attached to this about 2 feet from the front, at an angle of 21 degrees, the angle being such that the dirt will not stick to the mould board—different soils admitting different degrees. The sides of the mould board and the land side are shod with a strip of iron, extending $1\frac{1}{2}$ to 2 inches below the bottom. This is to make the machine enter the ground easily, and to cut the turf if necessary when lying loose. This angle can be increased or diminished by making the mould-board to move on a hinge, which is best affixed about 2 or 3 feet from the front end of the land side. As the plough which precedes will cut about 6 inches deep each time, 3 or 4 furrows may be found to be sufficient. The machine follows, and throws up the dirt, making a handsome bank on each side of the fence of such a slope as may be desired. The bank is raised 18 inches above, and the ditch cut 18 inches below the surface of the ground, thus giving a height, both included, of 3 feet. This bank helps to sustain the fence, and, leaving a ditch on either side, checks cattle from jumping; for whoever has watched the movements of stock soon discovers their great aversion to jump *from* a ditch *into* a ditch. Grass seed is sown upon the sides of the ditch, and they soon become solid. These ditches serve to drain the soil when it is wet, and also, when water is scarce, as a conduit for the rain to an artificial pool, which, by excavation, can easily be made, and covering the bottom with clay where the soil is sandy. The saving in this kind of fence is most mani-

fest. There are about 520 panels to a mile. Three rails would require 1,560; four rails, 2,080. These need not be more than $2\frac{1}{2}$ inches thick, but wider than the common narrow rail. A common Virginia or worm fence requires about 8 rails, besides stakes and a rider, to each panel; and four panels of a zigzag fence extend no further than three panels of the straight fence. Four panels of the crooked fence require 40 rails; thus there is a saving of 28 to 31 rails in this distance. In a mile the difference is between 1,500 or 2,000 and 6,000, a very important saving. If the rails are dry, the expense of carting 1,500 to 2,000, which make a mile of fence, is very trifling—only 15 to 20 loads. Besides all this, the Virginia fence leaves notches in the angles which cannot be cultivated, and serve as nurseries for weeds to poison the soil, and furnish fuel to consume the fence if exposed to fire. The same machine spoken of above is highly useful in turnpiking roads, because one of them will do the work of a large number of hands. Some bitter feelings had been engendered because I had interfered with those whose constant employment is to ditch with the spade. I might have mentioned that if twigs of cotton-wood or sycamore are inserted in the bank in the early part of the spring, they will take root and soon furnish shade and living posts. But locust seed, well scalded with boiling water, and suffered to lie in the same till cool, and sowed broadcast in mellow soil, will soon furnish most excellent timber, as well for posts and rails as for shade. The growth of the locust is astonishing. With these helps, therefore, we may expect a more speedy cultivation of prairies. Even now some large landholders have quit their timber lands and gone far into the prairies, where the land is ready for the plough, and thus avoided the expense of 10 to 12 dollars in clearing their lands; gaining also a smoother surface, where the mowing, reaping, and raking machines can work to better advantage, and against which the roots and stumps of timber land form such fatal obstacles.

Permit me to say, it is truly astonishing to witness the rapid growth of the northwestern States. With a fertile soil and congenial climate for labor, the eastern market will daily feel more and more the influence of western products upon the price of breadstuffs. There are now millions of acres of excellent prairie land fitted for the plough, and can be immediately brought under cultivation. Government land can be purchased at $1 25, and landed proprietors are offering tracts near good neighborhoods and schools for half the crops for 3 years, when a deed is executed without any cash payments. I have myself, during the year past, effected important sales on this principle, to the mutual satisfaction of both parties. Under these encouragements it is hoped that the west will continue to advance, and soon feel able to meet her engagements with better punctuality.

KILN-DRIED MEAL AND FLOUR.

This subject is of deep interest to the west, since corn meal is worth $17 the puncheon (800 pounds) in New York, and flour, from which the water is expelled, is so much more easily preserved. I visited the establishment of the Messrs. Gills, at Mount Pleasant, Ohio, and was, by their courtesy, (not granted to others,) permitted to examine minutely the whole operation of their very interesting and successful experiments.

Here I found two barrels of meal and flour, put up for me two years since; both were exposed, in an upper loft, to the heat of two summers. The casks were opened by myself, and both meal and flour were found to be perfectly sweet. I took samples of both, which I beg to leave in your office for exhibition. There are some peculiarities in the machinery and process of the Messrs. Gills, which they do not wish to disclose until their patent is secured. I will state, however, that the meal and flour are both dried, after being bolted, by means of hot air. The same thing has been attempted by other persons, but not with so much success, to my knowledge. From a barrel of flour 12 to 16 pounds of water are extracted, and a little more from a barrel of meal. Flour dried in this way has remained in New Orleans and Rio Janeiro during the hot summer months, and kept sweet, while cargoes of common flour were spoiled. There may seem to be a loss of 12 to 16 pounds of flour; but whenever the flour so treated is made into bread, it reabsorbs, as might be expected, 12 to 16 pounds more water than common flour; making in a cargo not a small saving in duties and freight, when sent to foreign markets. As staves are cheap at the west, I do not see why we cannot enter into a successful competition with the eastern manufacturers of corn meal, who have to purchase both corn and casks at comparatively high rates, somewhat greater than the difference of freight. Meal dried by hot air, has a further advantage. No change of taste in the flour is observed, nor is the hull of the corn mixed with the meal, as must be the case whenever the corn is parched, as then the hull is ground so fine as to pass the sieve. If European ports are ever opened to our breadstuffs, we can send them Indian meal—the cheapest food for their laboring classes—in a perfect state. At present the prejudices of the English people are proverbial against both Indian corn and meal. This prejudice will wear away; and as an evidence of this I would mention the cheerful relinquishment by the English, Irish, and Scotch, who migrate to this country, of their oat meal, if they can get our good sweet Indian meal. Indian meal requires particular cooking, to be good, even here. Hence we need not wonder at the unfavorable impression created by hard, clammy, dark, sour Indian meal bread from British ovens. In a late leading journal, published in England, the editor says a great deal against our maize and Indian corn meal. He "*stated from authority that it was deleterious to man and injurious to cattle;*" nor have I seen this statement contradicted there. Certainly, if corn meal offers to us, in this country, such a satisfactory repast, there can be no indignity in recommending it to those who are so necessitous, and even clamorous, for breadstuffs abroad. Since Indian corn cannot be grown in England, and hence will not come into much immediate competition with the wheat crops of landed proprietors, there is more hope of its introduction free of duty, or at least on more favorable terms. I think the time is not far distant when Indian corn will be *much* more consumed by man and beast in the British dominions. This new mode of preparing flour and meal is beneficial to government, which annually loses such sums from damaged breadstuffs. Both the army and navy, I am happy to say, will try experiments with the dried flour, and the Messrs. Gill are confident that it will keep perfectly sweet for two years, in any climate, if the article is preserved from dampness. The extraction of this dampness has given to it its great superiority, and this can only be obtained by preventing it from falling back again to its natural state.

AA.

[Referred to in the preceding remarks on hogs.]

"PETERBOROUGH, *February* 20, 1845.

"MR. ELLSWORTH—SIR: I received your letter requesting me to communicate the important facts relating to a pig raised by me the past year. I cheerfully hasten to comply with that request. The pig to which you refer was pigged February 18, 1844. I killed it January 3, 1845; of course it was 10 months and 15 days old. Its weight alive, the day it was killed, was 622 pounds—after being dressed, 547 pounds; rough lard, 18 pounds; offal, 57 pounds; total, 622 pounds. Girth around the heart, 6 feet; width across the shoulders, 21 inches; across the hips, 20 inches. From end of nose to root of tail, 5 feet 8 inches. The breed I do not know, further than that it was of a breed we have had in town for years; but should think there was no Berkshire blood in it. It was purely white, and the skin very white; hair, thin and short; short legs and short head; small, looped ears; and on the whole, a beautiful specimen of the swine.

"*Feed.*—He was taken from the sow at five weeks old, (the last week in March,) and during the month of April he was fed on skimmed milk, with a little meal. From 1st of May till the 1st of September, he was fed entirely on skimmed sour milk. September and October he was fed on boiled potatoes, apples, and pumpkins, about equal quantities, thickened with barley meal, and thinned with sour milk. November and December he was fed on corn meal scalded, once a day, and boiled corn and milk once. He was always kept under cover, and supplied with sods, weeds, brakes, &c. In addition to his carcass, he made six or eight loads of excellent manure.

"Yours respectfully,

"WILLIAM MOORE.

"This pig was fed three times a day till the last two months; and during the last two months only twice a day."

—

ON HEMP.

As regards the adaptation of Indiana and Illinois to the growth of hemp, there cannot be a doubt, and also of a large portion of the country north of the Ohio and west of the Mississippi river, as far north as the 47th degree, and eastward of the Hudson river. The price which farmers in the west would realize for a fair crop—say 700 pounds of lint per acre—would be $40 per ton in the stalk, delivered at the mill, or at $14 per acre. The cost of cultivation does not materially differ from that of corn or wheat. As regards the soil, all good prairie land will produce hemp; and bottom lands, if not too wet for corn, will afford an abundant crop. The quantity of seed is two bushels per acre, and the time of sowing from the 1st of April to the 20th of May, the ground to be twice ploughed and lightly harrowed; after the seed has been sown, harrow both ways and lightly roll. The time for cutting depends much upon the season; the usual time in your latitude for that sown in April would be from the 1st to the 10th of August; the seed should not be suffered to arrive at maturity, and the best guide for the

grower is the appearance of the blossom stalk, which will assume a bright yellow tinge near the ground, and then the knife should be applied. It should be suffered to remain on the ground, after being cut, only a few hours, merely to become slightly wilted; then bound in small bundles, and placed 12 to 15 in a shock, with the base of the bundles left open to admit a free circulation of air. Four to five days of fair weather will effect a thorough curing, and then it should be delivered to the manufacturer, or be well secured from exposure to the weather. The process adopted at one mill in Glasgow, Missouri, is to place the hemp in pools or vats, (90 feet long, $10\frac{1}{2}$ wide, and 5 deep,) crosswise; the bundles to be packed as close as possible, and well secured to prevent floating, by cross timbers at the top of the vats, before the water is admitted. At the bottom of the vats are steam pipes, passing through lengthwise, and between the pipes a water conduit, 70 feet long by 1 foot square, which is supplied by a perpendicular pipe, and perforated with holes for the introduction of water into the vats. The water, when admitted, should be at a temperature of 100° Fahrenheit, if possible; and the mean temperature during the process of rotting should be 90°. When the rotting is complete, (which is found to be the case, by this process, in three or four days at any season of the year,) the water is drawn from the vats, and the hemp removed to platforms, and placed in an upright position to drain; after which it is taken to the dry house. The time occupied in drying depends upon the quantity of aqueous matter to be evaporated; and, as a medium, 12 hours will accomplish it. The breaking and cleaning are performed by machinery. The hemp being spread upon an apron, is conducted through a series of rollers; thence on a cylinder, with crossbars, and is acted upon by beaters which intersect the spaces on the cylinder, and which serve to disengage the crushed and broken boon from the lint; it then goes to the scutcher, or hackle, and is then ready for baling. The time occupied from the period of placing the bundles in the vats, for rotting, to the delivery of it from the baling press, does not ordinarily exceed ten days. It is asked, what is the difference between American and Russian hemp? &c. I would say that so far as experiments have been made in effecting an analysis, the American has the advantage as it stands in the field; but the subsequent process to which it has hitherto been subjected destroys its richness. The fibre of the American has the preference in form, from the fact that each particle or strand is a cord of itself; while the Russian resembles a fencing sword—thick in the centre, with their edges; and this will account for the superior strength of many samples of tested American lint. The difference in climate has much to do with the matter. For instance, the temperature in Riga, during the hemp harvest, is from 40° to 60° Fahrenheit; while at a corresponding season, in this country, it ranges from 60° to 100°. Consequently, were the growth of hemp from the same soil, different qualities would be produced, even were the same operations observed in cutting and curing. The rotting process in Russia requires several months, from the fact of the water being near a freezing point for this length of time.

In the winter of 1843, I saw the same result in this country. The pools were filled in November, and remained until the middle of April; but there is no assurance of a uniform temperature at any season of the year. The preference for Russian over American hemp, at the present time, arises from the indifferent manner in which the American is cleaned and put up for market, and the absence of the vegetable oil from the lint. To obviate these difficulties, great care should be taken to avoid exposure while curing,

and also from the time the rotting of the hemp is completed until it is put up into bales. The process of drying in a close room is found to operate well, as the aqueous matter is entirely evaporated, and the vegetable oil contained in the wood or boon forced to the surface, and absorbed by the lint, and is an important life-preserver; but if the hemp is exposed to atmospheric action, the oil is entirely evaporated. The rotting process heretofore observed is quite uncertain in its operation. For instance, if the pools be filled in June, July, or August, that portion near the top will be nearly at the same temperature with the atmosphere, while that at the bottom is of the temperature of the earth, and the top courses of bundles become fermented, or macerated, while, on those near the bottom, fermentation has not commenced. At other seasons of the year, the same results are visible, though not to the same extent. The time required by this mode to effect the object, renders it a tedious and uncertain operation. As regards the difference between dew and water-rotted hemp, I am aware it is a delicate point to discuss. As my interest is involved in the water-rotting process, it may be considered a species of egotism to introduce a new system, to the injury of another. I would say, however, that such theories as I may advance are not speculative, but obtained from thorough experiments; and it is desired that every assertion made shall receive thorough investigation. The process observed by the farmers in dew-rotting, is usually to let the hemp remain in the field until the leaves fall from the stalk, and if the weather is moist, it becomes quite dark in color; but if the color is not changed at this time, it becomes so at the spreading in the fall. The lint is covered by a thick bark or husk, containing a strong acid, which, when acted upon by the oxygen of the atmosphere, forms a coloring matter which penetrates and discolors the lint, and often the wood or boon. The lint is secured to the boon by globules containing a species of gluten of a resinous character, and heat and moisture operating upon the stalk thus exposed loosen the globules from the boon, which adheres to the lint. Thus all of the gluten which grew in the plant remains in the lint in a decomposed state. This is the reason that tarred cordage has not been, and cannot be, successfully used when made of dew-rotted hemp. It has doubtless been often observed that dew-rotted hemp, after being exposed to wet, immediately decays; particularly in warm weather. This is owing to the action of the water upon the decomposed glutinous resin remaining in the lint, and fermentation at once ensues in the same form as in water-rotting. As an experiment, which you can at any time test, take an equal quantity of dew and water-rotted hemp, and leave them in an equally exposed situation, (say spread upon the grass,) and you will find that the dew-rotted will be decayed in one fifth of the time of the water-rotted. The snow-rotting, so much desired by farmers, is a process between the common dew and water-rotting. The exclusion of the air from the lint by the snow prevents the decomposition of the gluten, and the coloring matter is not formed except by a free access of the air to the stalk. The ultimate freezing and thawing of the stalk serve to disengage the lint, as in the process of dew-rotting. In the process of water-rotting at a temperature of 90°, active fermentation commences in 60 hours. The acid contained in the husk is neutralized, and a large portion of the glutinous resin is absorbed by the water. If the operation be continued, by removing the hemp from the pool, then drain and dry it in a close room and break and clean it immediately, a better article can be produced than is brought from any portion of the old world. Hemp thus prepared will

answer all nautical purposes, and also for manufacturing a large portion of coarse linen fabrics, with which we are now supplied from abroad. The quantity of hemp now imported is not much less than 3,000 tons annually; which is but a small portion of what arrives in a manufactured state.

There are no experiments to be made in constructing machinery for the manufacture of hemp and flax into fabrics of various kinds and qualities. One establishment in Leeds, England, in successful operation, occupies three acres of ground; and there are ten or twelve manufactories already established in the country. I will take the liberty to insert an extract from the report of the Commissioner of Patents for the year 1844. On the sub- of hemp he says: "The American hemp, in point of strength of fibre, durability and firmness of quality, can advantageously compare with the very best Russian hemp; but it is neither prepared, in the process of rotting, in a proper manner, nor is it even cleaned as well in the brake as it should be." These facts, together with an examination of the dark colored, badly rotted, and slovenly cleaned article, that is often sold to the manufacturer as hemp, prove most conclusively that the culture of hemp is yet in its earliest infancy. When an improvement in the culture and preparation of hemp shall be effected, there will be brought about with it a revolution in the manufacture that will tend to add even more to the general wealth and prosperity. Instead of consuming the best hemp in the manufacture of bagging and bale rope—fabrics so coarse, unsightly, and ill prepared, as scarcely to deserve the name, and in the manufacture of which we use our best material, in competition with the *tow and refuse* hemp of Europe—instead of this, our worst tow, by the adaptation of machinery to its manufacture, might be used for making a much superior article of bagging than is now made; and our good hemp would be used in making canvass or sail-duck, ship cables, cordage, and even *fine linens.* Out of hemp not a particle better or finer than ours, the finest fabrics are now manufactured in France, Germany, and Great Britain. Machinery of the most perfect kind has been in successful operation in those countries for years; and every kind of fabric, from the finest linen cambric to the coarse Dundee bagging, is there manufactured, and bought by us at high prices, when we have growing at our very doors, spontaneously as it were, the very material with which we could make the same articles, and furnish them in the whole of Europe at half the price we are now paying. As it regards the position government has assumed in the use of American hemp for the navy, the law of 1843 requires it to be tested, inspected, and purchased by agencies in the west. Thus far the requisitions of the law have not been complied with.

I would here say a few words in relation to flax, an article that has nearly ceased to have a name among the productions of our country; and if a cause can be assigned, it is that no system has been introduced to assist in its production. The process of dew-rotting has been generally observed in this country; or, if water-rotting has been attempted, it has been at a season of the year when nothing could be effected. I would say that the process as described for the culture and preparation of hemp is equally applicable to flax, and, if strictly observed, will yield a rich reward. The time of sowing is the same, and the quantity of seed should be slightly increased—say $2\frac{1}{2}$ bushels per acre. The harvesting should take place before the seed matures. It is important that great care should be observed in the curing, and also in all the manipulations to the bale press. In the present crowded state of the market with many of the products of the soil, it seems

desirable that all the branches of agriculture that will afford a good investment should be prosecuted. GEO. W. BILLINGS.

ST. LOUIS, MISSOURI.

ON BEES, &c.

BY E. G. KELLY, OF NEWBURYPORT, MASS.

No department of agriculture seems so much neglected at the present time as this; whilst the same amount of capital invested in any other branch yields less. Notwithstanding the large importations of honey and wax, at only twenty and fifteen per cent. duties respectively, the domestic supply commands a high price, ready sale, and fair profits. It appears that more than 628,000 lbs. of wax alone are annually produced in this country. Were there even no protection on the former, the foreign article would then be obtained at a rate that would enable the bee-keeper to feed it out in his apiary after the foregoing season was over, and realize a great advance for the honey in the comb. Success in the management of bees depends chiefly on a correct knowledge of their habits and instincts, thereby enabling the keeper to control them almost at will; and, also, on strict attention to their requirements, rendering them healthy, contented, and industrious. Four leading points essential to profit are yet but imperfectly practised or understood, viz: to obtain pure honey, uniformly free from brood comb; to produce artificial swarms; to prevent robbing; and, lastly, to prevent the ravages of the bee-moth. Most, if not all the pure honey, is at present obtained by placing small boxes or drawers in the upper part of the hive, in which the bees will work when no room is allowed them elsewhere; but even in these, though equally unnatural to her, the queen will sometimes lay her eggs. It is their instinct to work not only downwards, but beneath, and in continuation of old stock. They will, however, build readily in side boxes, but here the queen is almost sure to interfere. To obviate this, I have inserted small bars across the entrance to the lateral drawers, with interspaces to admit the working bees, while they arrest the queen and drones. This idea was suggested by an experiment made by Huber for a very different purpose. The least possible space through which the largest workers could pass, laden with honey and pollen, was ascertained by experiments at the entrance to the hives. The aperture allowed is a fraction less than three-sixteenths of an inch, being less than the diameter of the small cells—for which I shall claim no patent!

Artificial swarming, particularly in such seasons as the past, when bees very generally refused to swarm, has many advantages to commend it. I believe only one swarm came out in this town before the first of August, after which they are worthless. While my neighbors were in daily expectation of swarms in the usual way, with their drawers closed till too late to obtain much honey, I had three stock-hives arranged over empty hives, and the bees busily at work. On the 12th of June, a young brood was discovered in one of the bee hives, then two-thirds filled with bees and comb; the old hive was at once removed to another stand, still placed over a second hive or box, and then shut up for twenty-four hours. A cover was secured upon the other, and the bees confined thirty-six hours. New comb

was rapidly formed in the second under box, and the old one was again removed in like manner. On the 4th of July the old swarm was driven into a third box, leaving 50 lbs. of honey. A drought soon checked the usual supply of moisture, so that the second and the transferred swarms required feeding for their winter store. I divided a second stock the 25th of July; but being in doubt if the lower hive contained any brood comb, I immediately expelled the bees from the stock hive into an empty one, using tepid water in order not to injure the young bees, which it contained in abundance. This brood-comb being in a large old-fashioned hive, was cut down to 12 inches square (the size of the new ones,) and arranged in two of these. One was set over the transferred swarm, which immediately ascended, and, having a queen, took quiet possession. After twenty-four hours they were allowed to roam abroad, returning to their new home, ten feet from their former stand. The other box, containing the old comb, was placed over the bees at the old stand, and a communication opened. They reared a queen in due time, as did also the two that had been separated from the first stock hive, the cells of which were distinctly seen in each.

It is not uncommon for one swarm to rob another, especially in an unproductive season. In this respect I was vexed for weeks, through carelessness in exposing honey in the comb to common access. Myriads of my own and neighboring bees destroyed each other in the contest, till the honey was removed, when the latter made a vigorous attack upon my hives. Narrowing the entrance is the principal remedy given by writers; but in one instance this did not succeed. During the second, the queen in the infested hive was constantly croaking as if held prisoner, and at night but little honey could be seen. The bees also were greatly diminished by the combat, and perhaps by being enticed away. Early the next morning the robbers returned in great numbers, meeting with but little opposition. Finding the queen yet alive, and anxious, if possible, to save a favorite swarm, I closed the mouth of the hive and drove with it a distance of three miles. This was of course effected. At night I determined to try another experiment. I swept $3\frac{1}{4}$ pounds of bees hanging out of another hive into an empty box, and took them to the rescued swarm. These were united by placing one above the other, and fumigating both effectually with cigar smoke. No disagreement was observed, nor was it possible that but few, if any, found their way back, even of the robbers. In six weeks they were returned to their former stand, having apparently collected more honey than any one at home. Thus it will be seen that transferring and equalizing swarms may be as readily effected as dividing. In each operation the precaution should be taken to have a free circulation of air.

The great pest to the apiarian is the bee moth. No device will entirely prevent its incursions, without great care. Loosely twisted yarn, thickly studded with its woolly fibres, has completely protected the crevice between the hive and its bottom. Hives are not safe either on the ground or in the tops of buildings. I have tried them in the second story of a barn, the bottom boards projecting through, but around these the larvæ of the moth were frequently discovered. Another decided objection to such an elevation is the great difficulty the bees meet with in lighting upon the pedestals when returning heavily laden and fatigued, particularly in a high wind. When a swarm is unable to dislodge the moths, both bees and honey have hitherto been a total loss. By the use of the tunneled bottom, the existence and progress of the larvæ of the moths may be known and watched

by observing the size and quantity of their black oblong fæces, which falls down with bits of comb, &c. By this means I first discovered that the hive containing the old brood already described was thus doomed. The bees were at length transferred to an empty box and placed over a small swarm, with a sheet-iron plate drilled full of holes between them. At night, after the atmosphere of the two was sufficiently commingled, the divider of the two was removed, and the swarms united. No quantity of fæces was observed among the workers, and a few only hovered about the place of their former stand the following day. The moths had burrowed chiefly in the old comb. They evidently commenced their depredations where a bar entered the hive to confine the comb, which in the hurry of the operation was imperfectly adjusted, and the strong odor of the old wax attracted the parent miller. Most of the worms were drowned in the tub, and the honey was saved for feeding other swarms. The simplest out-door arrangement for hives is undoubtedly the best for bees, while it affords the least harbor for moths. My stand is constructed of joists, seasoned, planed, and painted, 20 feet long, fastened a foot apart upon three posts two feet high. Three such pieces of iron rods are so set upright in this frame that four will support a hive. The tops are filed to points to receive the bottom firmly. The hives are protected from the heat of the sun by trees, and in winter may be removed to an outhouse. I am convinced, from a very limited experience in the management of bees, that this plan is better than housing, unless the moth can be entirely excluded.

The tunneled and canaled bottom, recommended by Thomas Affleck in his work entitled "*Bee-breeding in the West*," is one of the greatest improvements in the apiary. His "subtended" or section hive, consisting of boxes a foot square, inside measure, placed one above another, I have also adopted, with the addition of glass, and the frames made use of in the "Russian hive," and his bottom, with the entrance enlarged three or four inches. I also use under-hives, with drawers. These are made $2\frac{1}{2}$ feet long, $1\frac{1}{2}$ wide and deep, including seven drawers, two on each side and three at top, with glass backs and hinge-doors.

Yours, &c.,

E. G. KELLY.

ON HOT-BEDS.

BY DR. MUNDER, OF NICOLET.

Take white cotton or calico of a close texture, stretch it, and nail it on frames of any size. Take two ounces of lime, four ounces of linseed oil, two ounces of white of eggs, two ounces of yolk of eggs, four ounces of finely powdered dry cheese. Mix the lime and oil; break the eggs well, separately, then mix them with the oil and lime, with a gentle heat; and, lastly, add the cheese, and stir it well. Spread this mixture over the cotton shades with a brush, allowing each coat to dry before applying another, until they become water-proof. I made several attempts according to the foregoing form, slightly varying it each time, but with the same unsatisfactory result—a thick mass, about the consistence of stiff mortar, which it was impossible to lay on with a brush. I lastly substituted two ounces of

strong lime-water for two ounces of lime, and mixed the other ingredients, excepting the cheese, in the heat of the sun. If greater heat be applied, this compound also will become a thick mass. The cheese only serves the purpose of filling up the interstices in the cotton or calico, if it be of open texture. The stuff I made use of was of very close texture, and did not require the cheese. The application of this composition renders the cotton semi-opaque, or like the ground glass shades. Among the advantages these shades possess over glass ones, the following may be mentioned: First, the *cost* being hardly one fourth of glass; next, breakage—if any accident happens to the calico, a needle and thread, and the composition, repair the damage. Next, the *light*—the shades require no watching; no matter how intense the heat of the sun, the plants are never stricken down, burnt, or faded, and therefore never checked in their growth; nor do they grow up long, sick, and weakly, as they would under glass, and still there is an abundance of light. Next, the *heat*—the heat, arising entirely from below, and being less influenced by the sun than when glass is made use of, is equable and temperate; which, in our variable climate, is a great object. The vapor arising from the manure and earth is condensed by the cool air passing over the surface of the shade, and hangs in dew-drops on the inside of the calico. I gave the experiment "a fair trial," in the fullest sense of the term, having laid down both calico and glass, with the same manure and heating, the same seed, and under the same aspect—southwest; and the result was, that the plants raised under the calico were stronger and healthier than those under the glass. The calico shades were always in advance of the college hot-beds, which are under the care of a professed gardener; as, also, of all the other gardens in this neighborhood. If the frames or stretches are made large, they ought to be intersected with cross-bars about a foot square, to support the calico, and thus render it less liable to injury.

Throughout the frosts of the last three weeks, the heat of the beds under the shades has not been checked for an instant.

MODE OF RAISING MUSTARD.

BY J. H. PARMELEE, OF DUNCAN'S FALLS, OHIO.

The *ground* should be light, lively, sandy loam, rich enough to produce fifty bushels of corn to the acre; ploughed as early as it will do to work; the tops of the furrows levelled with a light bush. This makes it easy and even for working the drill-barrow.

Sowing.—I use a drill-barrow—one with two large light wheels, easily worked by hand, made by Ruggles, Nourse, and Mason—cost fifteen dollars in Boston—ingenious, simple, and durable inplement. With this (supposing the lines from top to bottom to be the direction of the rows) lay them first one foot apart, then two feet, so alternating them thus, , and have the hole in the tin plate, through which the seed falls, of a size sufficient to drop three pints of seed to the acre. Begin with the plate which has the smallest hole, and ascertain the requisite quantity of seed by observation of the first, second, or third half-acre, decreasing the hole if necessary, to adjust its size to the quantity.

You will see the advantage of the rows laid off as above by inspection of any given number of feet—say sixty-six feet.

The difference in the number between the manner above and single rows at two feet distance is the *profit*, and the growth of the plant in the former way no more than fills the atmospheric space; whereas, in the latter it looks too thin and poor. These double rows have another important use, as will be seen presently.

The largest yield per acre of corn ever raised in Ohio was on the above plan, one foot and four feet, drilled—stalks, nine inches in the row.

Three pints of seed per acre makes the plants stand very thick; but, no matter—nature adjusts the distance and size of the stalks to the strength of the land. The undergrowth that is smothered helps to smother the weeds also. Therefore, let no thinning out be done.

Culture—As soon as the weeds peep above the ground, which is as early as the plant, and before it is large enough for a cultivator to pass between the rows, the fields must be plentifully stocked with hands, having light hoes and nimble fingers, to attend to the rows only, otherwise the weeds will be apt to smother the crop, which is very slow in its early growth. And these hands and cultivators must continue going over and over the field, (if it be large and the weed bad,) say four or five weeks, until the plant springs up and blossoms and branches, so that further working would be injurious to it.

Cutting.—When the leaves have all fallen off from the stalk, and it turns yellow, and the seeds in the pods, which are near the ends of the branches, are changed from a deep green to a brownish color, for the most part, through the plant and through the field, or such parts of it in which it will do to begin, then cut it immediately with the sickle, (cradling, which I have tried, would knock out the grain,) tenderly handling it, and laying that cut from two double rows upon the stumps of one, in heaps. These stumps form a fine support for the grain clear from the ground, and admit a free circulation of air under it. Let it lay three or four days until it is bone dry—or for a week, if you please—until you are ready to take it up for threshing. If rain come upon it, no matter—it will not hurt it.

Housing.—According to the extent of the field or force, have one or more canvas sheets of light hempen duck, 24 feet square. Clear a space and spread it upon the ground in the field, supporting the corners and sides by small stakes about the height of two feet. On this place top to top the heaps that lay around, or that may be drawn a short distance on a sled, furnished with a sort of hurdle of poles, to support a canvas sheet on that also. Thresh with flails. Four men can work to advantage on one sheet—three to thresh and one to turn and shake up. The heaps of grain should be taken close to the butt-ends of the stalks and lifted perpendicularly up, not dragged or gripped hard by the hand—otherwise much loss will ensue. When the sheet is charged with as much grain and chaff as can be conveniently handled, tie up and haul it to the barn floor, and then the canvas may be spread on another part of the field, if desirable, and so through.

Curing.—At the barn should be a hand to rake the bulk of the chaff from the seed as it is delivered, otherwise space will be wanted; and the seed, being at the bottom, will be prevented from drying. The hand must work *without shoes*, and rake the chaff from side to side repeatedly off the floor—every time sweeping the space clean before removing the chaff back to the opposite side, to be sure that no seed is thrown out with the chaff.

After such raking, the seed should lie in bulk in the remainder of the chaff and dirt (which keeps it from packing, and sweating and heating) for three weeks, and be thoroughly shovelled up and removed from side to side every day. By this means the seed cures bright and dry. Then pass it twice through a farming mill, furnished with a riddle No. 12, and the article is ready for market.

The foregoing is the result of fourteen years' trial in every form—in rows at different distances, broadcast, mixed with clover seed, with the view of smothering weeds, on different soils, at different times of year, &c.—and is the only method that was ever successful with me.

It seems to me that the agricultural community, both of the north and south, will be apt to complain of over-production, so long as its attention is wholly absorbed by a few leading and important objects, to the entire exclusion of various minor and profitable interests. In our goodly land, stretching through so many climates, we have a spot, and a good spot, for every production of the temperate zones of both hemispheres. An examination of that great work of the Secretary of State (his report of 1842, "on the commercial relations of the United States with foreign nations") shows us that we might very profitably transplant into our own genial climate various fruits, costly drugs, and valuable materials for manufactures, with a special view of exportation to other countries, without reference to the supply of our own country, where the demand, however, would be large and permanent.

And your own report shows (and in behalf of the industrial interests of our country, I am thankful for your valuable labors) that mechanical inventions, in their bearing upon agriculture, will soon place us on a level, as to cheapness of production, with those countries that are filled with coolies, serfs, and slaves.

Yours, &c.,

J. H. PARMELEE.

March 22, 1845.

Sir: You have in detail the process pursued by me in the cultivation of mustard in 1844.

As you want facts, I think it not amiss to state to you that I have followed the same process, in a like enterprise, the past season.

I planted 28 acres with brown, and two acres with white mustard seed. Of the former the yield was 305 bushels, and of the latter 15 bushels—320 bushels in all; which was 61 bushels less than from 27 acres of the same ground the year before.

The whole expense of the crop this season, delivered in New York, was $1,089; for 298 bushels I received $1,117. The article being plenty in the market, I was obliged to submit to a reduction of one cent per lb. from the price of last year.

This diminished quantity is to be ascribed to the capriciousness of the season, the weather having been either too dry or too wet, alternately—the reverse of that which the different stages of the plant required.

Comparatively, the result was fortunate, as several undertakings of the same kind around me proved entire failures; owing, I judge, to the neglect of seasonable and thorough tillage.

I am, very respectfully, your obedient servant,

J. H. PARMELEE.

Hon. H. L. Ellsworth.

LETTER OF MR. LEWIS, ON COLZA.

Dear Sir: The acquisition of any new branch of industry to a nation whose population and territory are so extensive as ours, will be hailed with pleasure by every true friend to his country; and it is a marked feature in the character of Americans generally, that they are always prompt to avail themselves of every useful improvement in the arts or sciences, no matter from whence it emanates. We perceive almost every year the development of some new product of agriculture or the mechanic arts. Under circumstances of great difficulty and discouragement, we have thus seen the gradual increase of our iron mines; our silk and wool growers; the opening of our vast coal regions; the extension of our foundries and machine shops, and remarkable and striking improvements upon the ingenuity of the old world, produced by the very obstacles and difficulties that embarrassed our earlier steps in each and all of these industrial pursuits. The dense population of western Europe, whose vast mass are so dependant upon the various products of agriculture for the staple commodities of subsistence, require at the hands of the cultivator a higher degree of knowledge in the practice of his art than is expected, or we may even say needed, from the American farmer of the present day. The irrigation and drainage of land, the chemical composition of manures, the alteration and fertilizing of soils, are now reduced to a system in many parts of Germany and France—a system that we shall attain whenever our necessities develope its value. The cultivation of the beet root in France is an evidence of what improvements the wants of a people will produce; and the same remark applies to the cultivation of the family of seeds, that are so productive of oil; an article that modern refinement applies in a thousand ways, and which ministers so directly to our comfort, when used in the production of artificial light. The present magnitude and importance of this branch of European agriculture may be traced to the destruction of the fisheries of the Atlantic seaports during the long continued wars of Napoleon. The necessity of a supply of oil for domestic as well as public uses encouraged the farmer to the cultivation of the rape, colza, and other seeds known to be capable of yielding a sufficient quantity of oil to pay the costs of production. And the continued absence of all kinds of fish oils from the market enabled those who attempted to make good this deficiency from the seeds of the earth, to mature their experiments, and, after much difficulty, find a method of culture that would repay them for their labors.

In a tour through various parts of Belgium and France, in the year 1844, I saw extensive plantations of the colza, which is a species of cabbage, defined by botanists as the *brassica campestris oleifera*, that produces a very excellent oil for combustion and other purposes. Upon inquiry, I was surprised to learn that this seed, and the oil expressed from it, is now considered one of the great branches of national industry, both in Belgium and France. So extended has its culture become, and the crop of oil is so abundant, that it is afforded at prices which I should suppose would effectually prevent the entrance of sperm oil as a competitor in the market. Observing that the soil upon which this seed appeared growing was by no means of the best description, I afterwards learned that the plant is so hardy that it will flourish even in a poor soil, though the crop in such cases yields but

lightly. In the belief that this seed might be successfully introduced into the United States, and that, if not now, we may hereafter derive some advantage from its culture, I procured a quantity, together with a treatise upon the method of cultivation, written by an eminent agriculturist, who has for many years given close attention to this subject, and is considered the highest authority as to the peculiar management of the plant.

It gives me great pleasure to have the opportunity of placing a translation of this treatise in your hands, together with a sufficient quantity of the spring and fall seed to enable you to supply many of your correspondents, who, I doubt not, will be willing to make trial of the plant, and ascertain how far it may succeed in our climate.

The oil of colza is, in its saleable condition, a clear, limpid fluid, of a specific gravity nearly equal to sperm oil, and one of the richest hydrocarbons from any of the family of oleaginous seeds. It was owing to these qualities that the French government long since adopted, and still continue its use in all their light-houses, which are estimated to consume, in the aggregate, 32,600 gallons per annum. The Belgian and Dutch governments also use it for a similar purpose; while the salons of Paris and Brussels are illuminated by its means. A perusal of the annexed translation will show that the culture of the colza plant is a very simple process, though requiring considerable care in the outset, until the nature of the plant is fully understood. There are, it appears, two plantings during the year, viz: in the spring and fall; with a transplantation of each, when the plant has attained a proper size. I have omitted no portion of the *instructions* that relate to the work in the field, but have left out a long and unprofitable portion relating to the threshing and storage of the grain, as well as a description of the windmills used for grinding; knowing that our farmers are well qualified in the art of securing their crops, and that wind is not used as a motive power in this country, where water power is so common. There are two kinds of mills used for expressing the oil from the seed after it is ground. The first is the hydraulic press, the same as used for sperm oil. The second is called the Dutch wedge press, or crushing machine, a very clear description of which may be found in the supplement to Ure's Dictionary of Arts, &c. The seeds of the French colza yield about 40 per ct., or two-fifths of their weight in pure oil, whose specific gravity is 0.9136, (sperm oil having a specific gravity of 0.9231.) It burns with a clear bright flame, with much less incrustation upon the wick than occurs during the combustion of sperm oil or lard, all animal oils being somewhat troublesome in this respect. The article is sent to market in small barrels, containing, by French measurement, one hectolitre, which is one hundred litres; and, converted into English wine measure, is 26.4 gallons. The market value of this oil averaged, during a period of 10 years, 92 francs per hectolitre; which, reduced to our currency and measurement, is about 69.6 cts. per gallon.

M. Fresnel, the chief engineer of the French light-house service, made a careful series of experiments, some years since, to determine the economical value of the oils of colza and sperm—that is to say, which of the two consumed the slowest in lamps producing flames of equal size and intensity; and he found the difference so trifling as to be unimportant. Similar experiments were tried at Edinburg by the engineer of the Scottish light houses, who states, in his report on the subject, that the difference is neary one fourth in favor of sperm; which result appears the most correct of the too, and I

have no doubt it is so. If the soil of our western prairie should prove congenial to the colza seed, it would seem as if that were the most appropriate region for its culture, where the farms are usually extensive and crops abundant. The principal difficulty seems to be in the transplantation necessary to the production of the crop, and the amount of labor which such a process necessarily involves. If, however, our farmers were merely to raise a small quantity, and a market were once established for the seed, the oil crusher would soon appear among the list of our manufactures.

I remain, dear sir, yours with great respect,

J. W. P. LEWIS.

Hon. H. L. Ellsworth.

Treatise on the cultivation of the Colza, or Brassica Campestris Oleifera, as practised in Belgium and France; abridged from the original of M. Hotton, Agronome Cultivateur Belge, Ancien rédacteur du Journal des Forêts, Auteur du Manuel de l'Elagueur, &c., &c., &c. By J. W. P. Lewis, C. E., 1845.

Culture.—Colza is a variety of the cabbage. It produces an oil generally used for illumination, but is also employed for many other purposes.

The yellow flowered colza, designated as the cold colza, is the only kind raised in Belgium or Flanders. Almost every variety of soil is adapted to the growth and profitable cultivation of this plant. Good soil will of course produce more abundantly than poor; but, in some years, as large crops are produced from soil of medium quality as from the best, hence the importance of improving soil of the former description. The above remarks are applicable only to the cultivation of the colza that is to be transplanted; the sowed colza, on the contrary, requires a good soil, and one that is in a fair state of cultivation; consequently not exhausted by previous crops. Thus the cold colza can be transplanted to all soils after the harvest of wheat, rye, and oats, while the grain that is sowed in general yields but poorly, except in the best soil. This difference in production arises from the fact that the sowed colza derives all its nourishment from the ground in which it is sowed, while the transplanted colza has the benefit of two soils. Further explanation on this point will be found in the following remarks on the period for sowing and planting colza.

Planting.—Colza designed for transplantation is commonly sowed in July—a little earlier or a little later, according to the state of the weather. The success of the crop depending upon the vigor of the plant, care must be taken to get those plants that are in a good and healthy condition. This may be effected by sowing early and rather thinly, though then there is some danger of the colza blossoming before transplantation; while, on the other hand, by sowing late there is equal danger of the plant being feeble at the proper time for transplantation. It is a difficult thing to obviate these matters in a general way; the only probable remedy is to choose a favorable spot of ground, and bestow particular attention upon the irrigation of the seed. Colza is generally transplanted during the months of September and October; more often in the latter. The sowed colza is generally sowed towards the end of August, or during the month of September, according to the weather. The seed should be cast at distances of about one foot.

March colza (colza d'Eté) is sowed from the 15th of March to the 15th of April. At this period the seed must be cast deep, to prevent it from being destroyed by insects. Colza sowed in July is always designed to be transplanted in September. The ground must be well ploughed and abundantly manured; then harrowed, and the seed thrown in small quantities. When too thickly sown, a thin and long stalk is the consequence. A good plant should be firmly rooted, with a thick and rather short stalk—say about one inch and a half in thickness, and a foot in height. The harrowing is indispensable, as without it the seed would sink too deep, and would thus be prevented from coming up uniformly. Colza is planted either with the spade or with the plough. Many give the preference to the former method, but we think without reason, for it is only with considerable difficulty that the stalk can be well planted in holes made by the spade, while in ploughed ground it can be planted with ease at a sufficient depth to be protected from the frost—a consideration of the utmost importance.

The ground intended to receive the transplanted colza should be twice ploughed; the first time as soon as the crop of wheat or oats is taken off, the second at the time of transplanting. The latter ploughing must be so managed as to leave beds of eight to ten feet in width, over which the harrow is drawn with the teeth upwards, in order to smooth the surface. In these beds holes must be made with the spade in as straight a line as possible, and the plants inserted in them. There is no objection to transplanting in the driest weather; on the contrary, though the plant may, in consequence of the dryness, droop for a while, it springs up with more vigor after the first rain.

Four or five weeks after transplanting, the process of hilling must be gone through with. This is done by digging a ditch about a foot square in depth between each row, and by throwing the earth taken therefrom about the roots of each plant. The foregoing remarks are equally applicable to spade planting. To plant with the plough, it is only necessary to insert the plant in the furrow, and cover the roots with earth.

Sowing.—It has already been remarked that the sowed colza requires a better soil than the transplanted. The preparation of the ground, however, differs but slightly.

As soon as the crop that precedes the colza is taken off, the ground must be ploughed, and shortly after harrowed. The same process must then be gone through a second time, the seed put in, and a light harrow passed twice over the ground; after which it must be rolled. This being done, furrows must be ploughed at intervals of about eight feet, and, as far as possible, they should be drawn on a slope, in order to drain the ground. About two months after sowing, the hilling (the process of which has already been described) must be commenced. It is desirable to preserve the clod cut from the ditch entire, it being very efficacious in protecting the plant from frost; and this being done, no further care is required.

Colza should be sowed as soon as possible after the crop that precedes it (most generally oats) is cut; and, in order to avoid loss of time, the oats should be gathered into sheafs [ricks?] placed upright, with sufficient space between to admit the plough and harrow. By this means the ground can be prepared for the seed without waiting for the previous crop to be taken away. March colza is, however, though of an inferior quality to the winter colza, held in estimation, from the fact that the crop, not being exposed to frost, is more certain in its results. It requires a good and moist soil, and is generally sowed from the 15th of March to the 15th of April.

Harvesting.—The period at which the grain becomes ripe varies according to the weather. Most generally, however, the time for gathering it is about the middle of July. The period of maturity may be known by the leaves, branches, and seed vessels assuming a *whitish* appearance. Great care must be taken not to cut the plant prematurely, as on this point depends, in a great degree, the success of the operation. When too ripe, a large quantity of the best grain is liable to be lost; and when too green the *quantity* of oil is much diminished, and the *quality* becomes poor. The plant is cut, with a sickle, about five inches from the ground. The reaper generally stands in the furrow and cuts on either side; this method being found to hasten the work very considerably. When the weather is dry, the cutting should take place only very early in the morning, because the seed vessels being then closed, prevent the grain from falling out, which is not the case later in the day. The plant being cut, it is left to dry, and this is accomplished in from two to four days, according to the weather.

Threshing.—The grain is threshed in the same manner as wheat, and winnowed after this operation. The bulk of the stalks is generally preserved for fuel, and the residue burnt on the ground—the ashes being valuable for bleaching purposes.

The preservation of the grain requires care, it being subject to fermentation if heaped up too thickly when newly threshed. The fermentation may be readily detected by the grain assuming a whitish appearance. To avoid this, it must be spread out so as not to be more than one inch thick, and must be turned every day for a week; after which, it may be formed into heaps of six or eight inches high. It must, however, be turned pretty frequently during the whole time that it remains in the granary.

The spade being of great importance in the cultivation of colza, it may not be amiss to state that the most approved instrument of this description is that called the Belgian spade, the blade of which is an oblong square, concave in its entire length; the socket solid, but not very thick; and, when the handle is in, the whole instrument forms a slight curve.

Manufacture of colza oil.—The extensive use of windmills in France and Belgium for grinding the various sorts of grain, has grown out of the absence of suitable water-powers in many of the richest agricultural districts. The steadiness of the latter as a motive force, renders it at all times preferable for such purposes. The machinery commonly applied in the reduction of the colza seed to a meal, suitable for the oil press, is composed of a pair of vertical millstones, running on a horizontal bed stone, enclosed in a circular wooden hopper or tub. The two vertical millstones, which are of granite, revolve on stout axes, passing horizontally through a vertical central shaft, upon the head of which is a large spur-wheel geared into a smaller one, the lower end of whose shaft connects with the water-mill by a pair of bevel gears. The two vertical millstones are thus made to travel round the circular bed stone, and by their weight crush the seed into a coarse meal. The operation is continued until the meal is of a suitable fineness to go through the next process. Before putting the seed under the operation of the edge stones, as above stated, it is found advantageous to pass it through a bruising mill, which consists simply of a pair of iron cylinders, turned smooth, and made to revolve so as to bruise the seed as it drops between them from a hopper placed over the opening above them. Scrapers are fitted to the under surface of each cylinder to remove any oil cake that may form upon them. This operation of bruising the seed is very necessary, because the

unbruised seed will slip away from under the pressure of the edge stones in grinding, and thus retard the operation very considerably.

The next step, after the seed has been ground to a mealy paste, is, to remove this immediately into the press when cold drawn oil, of fine quality, is wanted; but, for general purposes, the paste must be heated before pressure, as the yield is greater, and more easily obtained. The oil cake, from the first pressure, is passed through the edge-mill a second time, then heated up to 212° of Fahrenheit, before receiving a final pressure. The apparatus for heating the seed paste, which best fulfils the purpose, is that of Hallette, and consists of a pair of iron kettles, concentric, one within another, the space between being formed into a steam-tight flue, with an induction and eduction pipe to admit or blow off the steam with. A gate-valve opens on one side of the kettle to draw off the seed, while hot, into bags of hair cloth, which are then immediately subjected to pressure. *Stirrers* are made to revolve in the kettles by machinery. The hydraulic press and the Dutch wedge press are the two machines that are used in the extraction of oil from seeds; some prefer the former, while many assert the latter to be most applicable to this purpose. The best fuel for heating the seed, where steam is not used, is found to be coal dust made into cakes, as the heat must be raised slowly and kept low.

The manufacturer of oil who would economize in the article of barrels, and, at the same time, prevent losses by leakage, generally constructs a deep cistern of brick, laid in hydraulic cement, and plastered inside with the same. This cistern should be of a sufficient capacity to contain all the oil that is not intended for immediate transportation. Such cisterns are used in Tournay, and are found to answer in every respect.

The colza oil undergoes a final process of purification in the hands of the oil merchant, but this is beyond the province of our treatise.

The experience of many years has proved to us that the cultivation of this seed in Belgium, Flanders, and France, may be safely entered upon as a branch of industry that, under judicious management, is sure to repay those who make the enterprise, and the annual extension of its culture is the best proof of the truth of this opinion.

APPENDIX No. 2.

For the Prairie Farmer.

SMUT IN WHEAT.

BY A. L. CASTLEMAN.

Messrs. Editors : I am very glad to see the subject of the causes of smut in wheat discussed in the two last numbers of your paper, and propose to have the discussion continued by adding my mite of experience and observation. First, then, to Mr. Hardup I say the plan recommended in the March number of the Farmer is excellent—probably the best one now in use. But as scientific farming is in its infancy, it is right that we should be correct in theory as well as in practice, else the utility of our discovery stops with its first application ; whereas, on the other hand, if our theory be correct, or, in other words, if we attribute an effect to its *proper cause*, we are enabled to apply the same fact to other subjects, and with our eyes opened as to what we are about. Now, how do brine and lime prevent smut in wheat? By destroying the *vitality* of the sporules, says Mr. Hardup. Let us see. On the farm on which I now live, the gentleman of whom I purchased it sowed about five acres of wheat, (on the sod,) and so careful was he that he went some distance to procure seed free from smut. This he did, and sowed it. I saw it at harvest—it was very smutty, although the season was not one in which smutty wheat prevailed to any great extent. The grain was sown late in the season, and was immmediately followed by a light rain and cool weather, which much retarded its "coming up." The spring following, this same five acres of ground appeared so handsomely set with wheat, from the self-sowing of last year's smutty crop, that the owner concluded to let it grow and see what it would do. At the harvesting of this crop I owned the farm. Although it was a summer in which smut prevailed to a greater extent than I have ever known it (1843) in this country, yet this self-sown smutty wheat, on five acres, produced scarcely a smut head. In this case, what became of the sporules which are said to be "taken up by the sap vessels?"

Again : In the fall of 1842 I sowed wheat on the same farm, and find the following amongst my "notes on farming" for that year :

"On the first and second days of October I ploughed and dragged three acres of oat stubble—land in fine order. On the third I sowed two bushels of Egyptian wheat on an acre of it, and dragged it in. From this acre, notwithstanding the lateness of the season, I got a good crop of wheat, (20 bushels,) but rather smutty. On the twelfth, the other two acres were sown in the following manner : On one acre $1\frac{1}{2}$ bushel red chaff bald wheat, ploughed in. From this acre I got a yield of $18\frac{1}{2}$ bushels, and nearly as much smut as wheat. The remaining acre was on the the same day (12th) ploughed a second time—a bushel and a half of the same kind of wheat sown after ploughing, and dragged in. From this acre I got $22\frac{1}{2}$ ushels of clean plump wheat, almost entirely free from smut. What could have made the difference ? All my seed was prepared alike, brined and died, by rolling in ashes; the different pieces of land were equally good, and sown in equally good order. Can it be that the deep covering with the

plough at this late season weakened a part of this seed, and that this weakened portion produced the smut?"

The above is a quotation from my note book. I think we can spend a few moments profitably in recapitulating the above facts.

The first sowing to which I have alluded was done in October, followed by a rain and cool weather—the seed lay chilled a long time before it came up—the produce was smut from clean seed. The second sowing (self-sown) must have taken place in August, when the ground and weather were warm—the seed must have started immediately—the product was a clean plump berry, from smutty seed, without either liming or brining. Next, we say nothing of Egyptian wheat spoken of in the quoted notes, as that might have been more or less liable to smut than other kinds of wheat. But of the second kinds sown on the same day, from the same seed, prepared alike, and on like soil, we see that covered to the depth of three or four inches producing largely of smut, whilst that sown on top of the ground produces scarcely any. Another fact worth noticing—these two acres were sown the same season of the self-sown smutty wheat, and within twelve rods of it. Now, I ask any man to look over these facts, and say what he thinks is the cause of smut in wheat. I am a new farmer, Mr. Hardup, but have given much attention to this branch of the subject, and shall give more; and should I be so fortunate as to bring to light any facts worthy your notice, you shall have them, provided the Prairie Farmer will consent to become the medium of communication.

One request of you. Will you inquire of all your neighbors whether any have a distinct recollection of having raised smutty wheat from a self-sown crop, and communicate?

From the Cultivator.

RUST ON WHEAT.

Ed. Cultivator: Investigation would seem to have established that *rust on wheat* is a small plant of as regular and uniform a growth as wheat; and if such is the fact, any speculation on the subject would be useless. But if so, the rapidity of its growth, visible to the naked eye, is truly astonishing, and any information concerning that growth must prove interesting to the community.

Four years ago, the writer had on his farm in Tompkins county fifteen acres of beautiful wheat. The field was the admiration of all who saw it. It stood thick on the ground—was as tall as was desirable; the heads were large and long, and it presented a rich and beautiful appearance. It then promised from thirty to thirty-five bushels to the acre of superior wheat. This was the first week in July. The weather then became very warm, and for three days there were frequent light showers, with bright sunshine between them. In the language of the farmer, it was close, oppressive weather. Before the commencement of the rain, there was not the least appearance of the rust upon any of the wheat. On the contrary, it then promised one of the finest and heaviest crops ever raised in this State; but in less than four days the whole field was stricken with rust, and the result was twelve bushels to the acre of shrunken, instead of from thirty to forty bushels of superior wheat to the acre. The land on which it was grown

was a rich clay-loam, with a small portion of gravel, rather moist than otherwise.

The lot is situate near a creek of pure spring water, and during and immediately after the rain a fog was discovered above the stream, and also above other streams in the vicinity. All the wheat growing near those streams was much injured by the rust; whereas that which grew half a mile distant from them remained uninjured. Seven acres of mine growing on new ground, one hundred and fifty rods from the stream, escaped entirely; but it was sheltered by woodlands on two sides, and the ground for the most part was dry.

The first crop on this fifteen acres gave twenty eight bushels (wheat) to the acre; the second, (oats) forty; the third, (corn) one hundred bushels of ears; the fourth, (oats) forty; the fifth, (wheat) after oats the same season, twenty—all the finest of grain and no rust to cause injury. It was then stocked down with clover, and summer fallowed the second season for the wheat which was so seriously injured by the rust. If, as is maintained, rust is a plant, whence came it in three days? It was not wafted by the wind, for there was none; it being remarkably calm, damp, warm and sultry, and the sun between the showers shining intensely bright. But if it be a plant, for its growth, so as to injure wheat, it requires calm, damp, warm weather, and such weather must occur when the wheat is in the milk, or the grain soft. Some of our observing farmers say that if the rain is accompanied by wind, the rust does not injure the wheat.

My belief is that the rust plant or fungus, whatever it may be, always exists on the stalk of the wheat, but that its growth is not such as to injure the plant unless warm weather and moisture unite at a particular period during the growth of the plant, and that prior to that period it is not visible to the naked eye; also, that during seasons unfavorable for its production it does not attain maturity. If, for example, the grain has passed the milky state, and has become in a degree hard, then the rust will not injure it in the least, however favorable the weather for its production may be.

In confirmation of this, he would remark, that during the most part of July last, in this section, the weather was very dry and warm. Yet about the 15th of the month, we had some wet, warm weather, and the consequence was that most of our fields of wheat were stricken with rust; but the berry was formed when the wet weather commenced, and the wheat was too far advanced to be injured—the rust proved too trifling to cause injury—the wet and warm weather was not perhaps of sufficient duration. The showers were short, and the rust did not so far progress as to stop the circulation of the sap, and the berry obtained the necessary supply.

Our crops of wheat have not been so fine for many years—the berry is large and the wheat of a superior quality. Even the late sown wheat, although affected by the rust, has escaped injury. The berry is not inferior to that sown earlier, but the yield to the acre is not so great by one-fourth. Superior cultivation and early sowing are the best preventives of the injurious effects of rust yet discovered. But the writer believes he has discovered a remedy for the rust, plant or no plant. He is preparing to make the experiment the next season; and if successful, the result will be communicated.

He also believes that great crops of wheat may yet be grown as well in the counties on the Hudson as in western New York. We shall see.

A Farmer of Tompkins County.

From the Dublin Evening Post.

"Smut in wheat is of two affinities to the growing crop in which it is found: the large full-eared smut, equal in growth, in luxuriance, and, at first sight, equal in all respects to the healthy ear beside it; and the small, stunted, and comparatively innocuous smut. How are these two species of smut produced? The argument in one case will hold good in both; we shall, therefore, confine ourselves to the full-eared fungus. The grain of seed, in this case, is equal in size to the sound grain, but diseased from some accident, either while on foot in the field, by an untoward season, such as the present has been, or by damp in the sheaf while in or after having been removed from the field, or by any one of the thousand accidents to which it is liable before it is committed to the earth to germinate, in the hope of producing its quota of a new harvest. Now, we will suppose it to have been injured by moisture, no matter from what cause—the effect is sure to be the arousing of the incipient powers of germination; the acrospire [plumule] will swell and make an advance from the seat of germination along the back between the two coats of covering, or bran, in which the farina is enclosed. Now, suppose this first disposition and spring of germination be stopped, and that the grain be restored to a dry state; the natural result will be, that vegetation will at once cease, and the vegetation already produced will shrink back, leaving no visible trace that it had been ever brought into action. The question is, would that grain, if sown, ever produce any thing but an abortion? Never: and that abortion would be smut. The natural spring was called into action by moisture; it was afterwards retarded by drought. Nature, in the assertion of her laws, will not be commanded in her processes of reproduction; and when the husbandman will sue to have that grain of wheat restored to its original state, in the hope that new wheat would form it, nature resists the application, and forbids the base grain a participation in the reproduction of its species. We have said that the sound grain will germinate, will produce a sound stem, will blossom fully, and yield its quota of wheat. The other will regerminate, will produce an equally luxuriant stem, shoot forth an ear in the young state perfectly equal to the sound one, but will not blossom nor receive the impregnation of blossom from the ears surrounding it. The result is self-apparent. If it do not manifest in itself, nor receive the impulsive principle of reproduction from its own species, it is plain that it cannot bring forth a reproduction of that species. Yet, the ear is full—of what? Of a *lusus naturæ*—the smut-ball. * * * * * * *

"We would suggest that no man should sow any portion of the present produce of his own farm. A change of seed from a distant district will do more than compensate for the pains and expense of procuring it. The soft, ill-conditioned, and partially sprouted grain is to be avoided. The even, well-shaped, sound, and friable grain is to be chosen. Having selected that, and the ground being ready to be sown, the first essential is, steeping of the seed for about fifteen hours in sea-water and blue-stone. Where sea-water cannot be had, strong brine will answer the purpose. About half a pound of blue-stone, first brayed to powder, and then dissolved in soft water, will be sufficient for a half barrel of brine to steep the first barrel of wheat—a quarter of a pound for the second, and two ounces for the third barrel; adding brine according as evaporation and absorption may have decreased the original half-barrel. When the seed will have been about fifteen or eighteen hours in steep, it is to be removed from the brine, and slacked lime sifted on it freely. When the external moisture has been absorbed by the

lime, the seed may be sown with that confidence which has its rise in the conviction that all that man could do had been effected in the order of reproduction.

"The properties of blue-stone and salt in solution are of so penetrating a nature as to be resisted only by the sound grain. The sickly, or diseased, or otherwise injured grain, does not possess the principle of vegetable life sufficiently active to resist the influence of the solution; and the plain conclusion is, that all the powers of incipient germination are destroyed in the diseased grain, which, when thrown into the ground, will rot, and never shoot forth a stem; consequently, in a field sown with grain thus prepared, we may, generally speaking, look in vain for 'smut.'"

New York Farmers' Club.

At a meeting of the New York Farmers' Club, held on the 5th of August, Dr. Underhill said: "To avoid the fly and the worm in wheat, sow early or late; when your grain has attained some height, you will find the nits of the insects upon it; then turn in sheep or young cattle, who will eat off all the blades, nits and all. If you sow late, you avoid the nits—you may miss them; besides, the manure left by your sheep is very good for your crop. I know but one remedy, which is easily tried, and is said to be effectual. It is quick-lime, slacked perfectly fine; when dried, take it with your three fingers (just as you do grass seed) all over your wheat-field, soon after the wheat is in blossom, and when you see the flies hovering over the field: sow in this way about two pecks of lime on an acre. The dew will moisten the lime, and it then reaches the insect larvæ and kills them. This process has saved a whole wheat crop on one field, while a neighboring one was destroyed by the worm."

From the Maine Farmer.

WEEVIL, OR GRAIN FLY.

Mr. Holmes: Having recently ascertained some facts in regard to the origin of the weevil or grain fly, which may not be generally known, you may communicate them to farmers if you think proper. I have been of the opinion, for several years, that the weevil fly was the insect which is found in the white froth upon the grass at this season of the year. The froth and the weevil made their appearance among us at about the same time. Upon examining the insect in the white froth, just before it comes to maturity, you can see all the features of the fly. In order to be sure that the insect in the froth was the genuine weevil fly, I a few days since cut a number of spears of grass, with the froth and insect upon it, and put them in a tumbler, and covered it with thin gauze, and in a few days I had quite a number of the real genuine weevil fly, as bright and active as you will find them in a few days upon the wheat heads. We may expect a large crop of them this year, as there is more froth upon the grass than I have ever seen before in any season. What it is that deposites the insect upon the grass, is a subject for further investigation.

Respectfully yours,

JOSIAH ORCUTT.

Monmouth, *June* 26, 1845.

Note.—We thank our friend for this account of his experiment. By experiment and observation we obtain much valuable knowledge. We are inclined to think, however, that, on a careful comparison of the two flies, (viz: those from the froth and those on the wheat,) they will be found to be different species.—Editor.

From the American Farmer.

ANOTHER WHEAT INSECT.

An insect has been found the present season in the wheat fields in various parts of the State, which does not correspond with any description that we have met with. It is a white worm, about one-fourth of an inch in length, ribbed, without feet, with two forked black lines upon its head, (shown by the microscope,) and in some instances with a streak of light green extending lengthwise. It is invariably found just above the upper joint, and within the straw. There it feeds upon the inner surface of the straw, abstracting its juices, and preventing their ascent to the head. It was first observed by us when the grain was in the milk, and its presence was denoted by the head having turned white prematurely. Upon examination, the head was found perfectly empty; the straw, like the head, white for several inches down; while below the upper joint it had the thrifty green color of the rest of the field. On opening the stalk, the worm was generally found as before mentioned; in some cases its ravages were seen, but the insect had escaped. In such cases a slight puncture in the straw was commonly perceptible, where it might have made its exit. In one instance nine eggs were found in one straw, and a very minute worm, apparently just hatched from one of them, resembling the insect as found elsewhere, except in size.

With a view of observing the transformations of the insect, we put several wheat stalks, that showed its presence, into a glass jar, with a little dirt in the bottom, for the insect to bury itself in, if such should prove to be its habit, and undergo its transformation. As it increased in age, it became of a yellowish green color, and at length was found slightly mottled with black, and motionless. After the lapse of a fortnight, we observed one morning, on the inside of the jar, a greenish colored fly, about three-sixteenths of an inch in length—being a little shorter than the worm, and of the same color. On the surface of the dirt was observed a cast-off skin, resembling that of the worm.

To be certain that the fly proceeded from the worm, we enclosed several of the pupæ closely in a paper, and, a day or two after, found, upon opening it, the same kind of fly, and the skin whence it issued.

To most farmers with whom we have conversed we find that this insect is, as it was to us, a stranger. We have met with one who says he observed it several years since. With some, the blighting of the wheat-heads passed as the effect of the late frosts. The injury done by it as yet is not serious. Whether it is destined to become another troublesome pest to the wheat-grower, time will determine. If any person can give us information concerning it, we should be glad to have it communicated. Perhaps some of our exchanges can tell us all about it.

From the Boston Cultivator.

SEED WHEAT.

Messrs. Editors: We are told, that in the island of Jersey, (England,) where the farmers sell their *produce* and live upon the *refuse*, it is customary for them to tie their wheat in small sheaves, and by striking each twice or thrice across a barrel while lying on its side on the floor, a superfine sample of wheat is obtained for market; after which the sheaves are thrown by to be clean-threshed, in the evenings of winter, by lamp light.

I have just met with the account of a farmer in Vermont, to whom his neighbors resorted for the purpose of securing seed wheat of superior quality; very fine in appearance, remarkably productive, and of early maturity. He readily commanded three dollars per bushel, when the price of wheat was a dollar and a quarter—calling it the red and genuine *barrel wheat*. But the secret was at last discovered; he used, before threshing his wheat, to select the best sheaves, and, striking them over the side of an empty barrel as it lay on the floor, three or four times before laying them down to be clean-threshed, he obtained in this very simple way a very superior seed-wheat, which the whole county coveted at a double price. Thus the largest and ripest kernels were separated and collected without labor or difficulty, and a profitable business was carried on, until his neighbors discovered how to make "barrel wheat" for themselves.

EDMUND LAWRENCE.

Newark, N. J.

Bloomfield Farm,
New Middletown, Frederick county, Maryland,
January 8, 1846.

Sir: According to the promise I made when I last saw you, I now communicate to you the information I have of the growth and production of wheat, corn, rye, &c. I have been experimenting for a number of years, and have discovered that in all diseases of wheat, rye, &c., there is a first cause, unvarying in its effects; and in order to avoid the disease, we must first find out this first cause, and the proper remedy may then be employed.

In order to improve wheat I select a piece of new land with a north-western aspect; and if I have no new land with such exposure, I take old land lying in the same way and manure it with fresh horse dung, and find it will answer equally as well. You may ask why I select land with this particular exposure to sow my wheat for seed the next year. The reason is this. In the first place a cold hillside renders the wheat more hardy and its color brighter, and when sowed on level land, or southern hillsides, it stands the winter better and ripens six or eight days sooner; consequently it is more likely to escape the mildew and scab, which are known principally to attack late ripening grain, and every year destroy millions of bushels.

In order to prevent smut, after selecting my wheat for seed as above mentioned, letting it get thoroughly ripe before I cut it, I put it up in round shocks, capped with two sheaves butt end up, to secure it from the weather. After threshing it I put it in my granary, sprinkling slacked lime over it at the rate of one peck to ten bushels of wheat. This prevents the wheat from getting into a sweat or heating. It also is an effectual preventive of

the attacks of the weevil, applied either in this way or sprinkled over every layer of sheaves in the stacks or mows. When I am ready to seed my land I prepare my wheat by steeping it in a strong brine of salt and water, that will float an egg, and add to this two pounds of saltpetre and a half pound of blue vitriol (sulphate of copper) to every ten bushels of wheat. After taking it out of the brine I roll it in lime before sowing. The above articles are very cheap, and are in my opinion a certain antidote to smut, and improve wheat in quantity and quality at least ten per cent. The crop from seed thus prepared ripens eight or ten days sooner than wheat sown without any preparation, and consequently is less liable to mildew or scab.

Last year I had 15 different species of wheat growing. Of these I think the following are best adapted to our soil and climate: First, the China. This is a beautiful white wheat, first introduced from the north of China. It produced me this year $47\frac{1}{2}$ bushels per acre. Secondly, the Oregon, brought from Oregon by a missionary in 1839. This year it yielded me 50 bushels and 1 peck per acre. (For a full description of this wheat see the Hon. H. L. Ellsworth's report, as Commissioner of Patents, for the year 1845, page 433.) The "Yorkshire Brown" is a beautiful large, red berry, early in ripening, brought from England, and produced me 37 bushels per acre. "Mount Vernon" is a beautiful wheat, and derives its name from its having been first grown in this country by the illustrious Washington, at that place, many years since. It is believed to be a French wheat, sent over by the friend of Washington and his country, General Lafayette, in 1795. It is an early bald wheat, well adapted to poor land. This year it produced on *poor* land 35 bushels per acre. "May" wheat is very early, and yields well. It ripens before rye, and consequently is not subject to rust or scab. This yielded me $37\frac{1}{2}$ bushels per acre. "Mediterranean" wheat is well adapted to this climate, and grows well on thin lands. Its weight is remarkable. In several instances it has been known to weigh 67 to 68 pounds to the bushel. I sowed this year, for the first time, several very handsome kinds of wheat. The first is from Poland, and called "Polish" wheat. The appearance of this wheat, growing, is splendid. It has almost the appearance of young broom-corn when it first makes its appearance above ground, the stalk is so very strong and coarse; and I am disposed to believe, from the experiment I have made, that it will be well adapted to our climate and soil, and a profitable wheat to sow on thin soils. From the fact of the stalk being so hard and strong, I am induced to believe that it will be impervious to the attack of the fly. It is a white bald grain, heads very large, and the yield great. I have also made an experiment with a wheat called the "Etrurian" wheat. This is from Italy; very large berry, white, and of good appearance. Another Italian wheat that I have, denominated the "Tuscany," can 't be beat in its beautiful form and color. The berry is beautiful—very white; the chaff is white, without awns, or beard, and the growth of the plant closely resembles that of Polish wheat. I am disposed to believe it will suit our section of the country well; and the shape and appearance of the berry will recommend it to the attention of those who are select in their choice of seed. It ripens early, and, before ripening, it casts off its leaves, leaving room for the free circulation of the air and sunshine, and consequently ripens perfectly. This, I think, will always exempt it from danger of mildew or scab.

I have been frequently amused with the speculation of some farmers in relation to the well-known failure of the rye crop in this section of the

country. They exhibit so much ignorance of the nature and instincts of vegetation, that it must be a matter of surprise that men who are brought up to farming, living in the midst of vegetable life, should not be better acquainted with the laws of nature which govern the growth of plants. I wonder how much wheat we could raise here if we had continued sowing the old red-bearded wheat, when it had actually exhausted itself, or run out, as it is commonly termed, in ten years. In consequence of rye being less valuable than wheat, farmers have never taken the pains to change their seed; therefore the rye has degenerated, and become so weakly that it will not bear the severity of our winters; or if it does, and arrives to maturity, the berry is not much better than chess, or cheat, as it is commonly called.

I would recommend them to procure the seed of the large Irish white rye, as the best adapted to their use.

I will now give you a history of the introduction of the Oregon corn, and its characteristics. It was brought to Cincinnati in the winter of 1838, from the southern part of the territory of Oregon, and presented to General Harrison, who cultivated it in the year 1839, and stated that it would produce 30 per cent. more than any other species of corn he ever planted. He was induced to make this statement from the fact that nearly every stalk bore from two to three ears, and from 18 to 24 rows of grains to each ear. This corn has a remarkably thick stalk. Its roots run deeply into the ground, and consequently resist the drought better than any corn I have ever known. The grains are from a half to three quarters of an inch, and in some cases one inch, in length, growing on a very small red cob. Its yield in 1843, from several acres at one end of a field, was 121 bushels to the acre, and shelled seven and one-half bushels to the barrel. (Our common corn only shells five bushels to the barrel.) From this it will be readily acknowledged that it is deserving of the attention and cultivation of every agriculturist desirous of receiving the largest return for his labor, as it yields at least 40 per cent. more than the corn generally planted by the farmers in this section, and is much better adapted to their soils than any kind now in use.

My opinion of the nature of the Hessian fly, and its destructive character, you will see by referring to the report of the Commissioner of Patents for the year 1845, page 433.

I have discovered another steep for wheat, previous to sowing, different from that I spoke of as having used, in the commencement of this letter, which is cheaper and better for that purpose. By subjecting wheat to this process, it will not only be improved in quantity 10 per cent. an acre, but it will cause it to ripen sooner, and change the color of red wheat to white in two years' application. This is a discovery entirely my own, and many persons have advised me to have it patented. I have not the receipt with me at this time, but I will give it to you at some future time, as I consider it too valuable to be withheld from the farmers of our land.

I will send you specimens of my wheat as soon as practicable after harvest, if we both live, and I shall succeed in raising my crops.

I am, sir, very respectfully, your obedient servant,

H. R. SMELTZER.

Hon. Edmund Burke,
Commissioner of Patents.

From the Cultivator.

SPLENDID SAMPLE OF WHEAT.

The recording secretary presented the following letter, with the accompanying sack of wheat:

Sir: I send you, for the State Agricultural Society, a sack of the wheat considered the best grown in old Castile, and sent me lately by a friend in the north of Spain.

The Talavera wheat, already familiar to English and American farmers, is also a Spanish variety. It came originally from Estremadura, a province in the south of old Castile, and of a milder, more uniform climate. The Castilian wheat, it may therefore be inferred, will prove a hardier species.

I have sent to General Rawson Harmon a similar sack, and proposed to him, should its introduction be accomplished under his experienced and enlightened management, to name this variety the *Aguirre wheat*, after D. Macsimo de Aguirre, our excellent consul at Bilboa, to whose good offices I am indebted for the specimens I have received.

General Harmon remitted me last winter, for a friend in France, several varieties grown under his care at Wheatland. Ten kernels taken indiscriminately from these, weighed—

Of white Provence (French)	$8\frac{1}{2}$	grains.
Wheatland red	$5\frac{1}{2}$	"
Virginia May	5	"
Soul's red	5 4-10	"
Soul's white	5 4-10	"
Talavera	7	"
Improved white flint	5	"
The "Aguirre" weighed	$8\frac{1}{2}$	"

A person as little acquainted practically with the tillage of wheat as the writer, would infer, from the above table, that a certain weight of French Provence, white, or "Aguirre wheat," would furnish a greater amount of flour, and less amount of bran, than an equal weight of either of the other varieties.

The bread made from the wheat of old Castile I have never seen surpassed in whiteness. In Spain, as you are perhaps aware, this universal article of consumption is not leavened.

What I send is for distribution, if you think worth while. I will seal up four or five pounds, which might be kept in the room of the Society as a standard whereby to determine the changes the wheat may undergo by culture in America.

Respectfully, yours,

ISAIAH TOWNSEND.

L. Tucker, Esq.,
Rec. Sec'y N. Y. State Ag. Society.

P. S.—I have just had weighed a half-peck of the wheat. The weight was 8 lbs. 9 oz. avoirdupois. This would give $68\frac{1}{2}$ lbs. to the bushel. As this exceeds by $2\frac{1}{2}$ lbs. the heaviest wheat (Hungarian) in Lawson's Museum, (vide his Agriculturist's Manual, p. 14,) I think it wants verifying by a better balance than that I used—the scales of a corner grocery.

I. T.

ALBANY, *November* 24, 1845.

SIR: The wheat of which you speak in your letter of November 18, I received in the course of the summer from a friend, D. Maximo de Aguirre, now or lately our most worthy consul for the port of Bilboa. He describes it as a specimen of "the best wheat of the province of Leon. Similar qualities are raised in La Mancha and Valencia, but none superior."

By reference to a letter addressed by me, with a sample, to the N. Y. S. Agricultural Society, and published in the Cultivator for the month of August, you will find some particulars respecting this variety which may possess for you some interest. In the letter, the wheat was erroneously stated to be of old Castile, instead of the sister province of Leon, and to weigh 68½ lbs. per bushel, instead of 67½, as was determined by more accurate instruments and more care in the trial.

M. Aguirre sent me a fanega of the grain. Of this I have distributed all, except two small sacks of four or five pounds each. It will afford me great pleasure to forward you one of these, which I propose to do in charge of the member from Albany, the Hon. B. R. Wood.

Samples of the wheat have been sown this fall by Judge Lawrence, Bayside, Queens county, Long Island; Messrs. T. Hillhouse, Watervleit, Albany county; M. D. Burnet and P. N. Rust, Syracuse, Onondaga county; Gen. Harmon, Wheatland, Monroe county, N. Y.; and in Virginia and Michigan. Should you wish to ascertain at your office the results of these experiments, you have only to address the gentlemen I have mentioned. General Cass and Mr. Ritchie (of the Union) will inform you to whom you should apply in Michigan and Virginia.

Respectfully, your obedient servant,

ISAIAH TOWNSEND.

Hon. E. BURKE, *&c.*, *&c.*

From an Ohio paper.

HACKLEMAN WHEAT.

Having heard of this wheat, I inquired after its history and qualities. The Brookville American thus answers our interrogatories. We hope, before long, to visit Wayne county, and shall embrace the opportunity to procure some seed. If any of our farmers would like to try this wheat, we will cheerfully aid in getting it for them.

"In our previous notice of the Hackleman wheat we were not sufficiently understood. The wheat known in this neighborhood as the Hackleman (or Alabama) wheat, was introduced here by Judge Hackleman in the year 1836. This was the first that was known of it either in Ohio or Indiana. In the summer of 1836, the Judge was travelling in the south, and being a good practical farmer, who always sees and improves upon everything worthy of his attention, saw a small quantity of wheat different in appearance from the usual crop. He obtained from a woman a small quantity, which he brought home in his saddle bags, and from which all the wheat of this kind in this State and Ohio has been obtained.

"The Hackleman wheat has many qualities which make it superior to any other wheat in this country. It ripens from ten to fifteen days earlier than any other wheat; and consequently has yet never been known to be affected in the least by rust, which so often proves fatal to other wheat. It averages about sixty five pounds to the measured bushel; being, on the average, three pounds heavier than the *red-chaff bearded*, five pounds

heavier than the common, and from five to ten pounds heavier than the *white wheat.* The Hackleman wheat is bald, with the exception of a few long beards on the point of the head; the wheat is rather dark, and flours well.

"This year this wheat did not do as well, probably, as other wheat, it having been injured materially by late frosts after it headed and jointed, from being earlier than other wheat. But in ordinary seasons there has not been this objection.

"Such a demand has there been for this wheat for seed, that little or none found its way to the Cincinnati market until probably last fall, and then in small quantities. For the last year it has been selling here from fifty to a hundred per cent. higher than the common wheat, for seed. Of late, however, we see it has been favorably noticed in the Cincinnati papers.

"Judge Hackleman called it Alabama wheat, although he did not obtain the seed in that State; and it is due that the farmers and millers should call it *Hackleman wheat.* Should distant friends wish it, we believe any quantity can now be had in this region. If it should prove to be no better, it will be well for farmers to sow a part of this kind, as it will ripen sooner, and thereby give farmers a longer wheat harvest."

To the Editor of the American Farmer:

Mr. Editor: Any improvement in the various kinds of wheat is a subject of much importance to the agricultural community generally; and when anything has been effected in this way, it cannot be too generally disseminated.

Many have been the efforts to introduce foreign wheats and assimilate them to our soil, but very few were found to which our climate was congenial. Among the most valuable is the "*Mediterranean.*" The success with which this variety was cultivated induced a search after a better kind, possessing the same advantages, but without its objections, among which is its weakness of straw, causing it invariably to fall on ground of much fertility. It is also a bearded wheat, which is a decided objection, making it very disagreeable to handle, and withal a very dark wheat. But a variety has been introduced by Com. Stewart, called the "*Etrurian,*" which possesses all the advantages of the Mediterranean, and has, besides, a remarkably strong and vigorous stalk. It is quite as early as the Mediterranean, and has a beautiful long, smooth head. The grain is of a superior quality, being round, plump, and white, with a remarkably thin bran.

My attention was attracted to this valuable wheat, a few days since, on the farm of the Rev. Daniel Zollickoffer, near Uniontown, in this county. On inquiry, I found that Mr. Zollickoffer (who, by the by, is one of our most enterprising and successful farmers) had procured it from Com. Stewart's second crop. Mr. Z. has cultivated it two years, consequently full opportunity has been afforded to give it a fair trial; and he assures me that instead of deteriorating, as most foreign wheat generally does, it has improved in every crop that has been grown in this country. I saw it growing beside the Mediterranean—both sown at the same time, about the middle of September, and on ground of the same quality. The Etrurian is equally as forward as the other, and much better headed. It is the richest piece of grain,

I think, I ever saw, and must yield very abundantly, although growing upon ground of but medium quality.

This wheat is not, as its name would indicate, brought from the little island of Etruria, but from Italy. It will very probably, ere long, supersede all other kinds of wheat, as it certainly possesses decided advantages over them. One great recommendation of it is, its being so early as to be in no danger of the rust. It is believed, also, to be fly proof, as no fly, I am informed, has been discovered in it since its introduction into the United States.

From the American Farmer.

THE ETRURIAN WHEAT.

We would call the attention of farmers to the advertisement of Messrs. Boardly & Cox, on our last page, offering for sale a lot of the wheat of a variety termed "Etrurian," noticed in our last as having been raised by Rev. D. Zollickoffer, of Carroll county, Maryland, from seed imported by Commodore Stewart, and raised on his farm in New Jersey. We have full confidence, from what we have learned of this wheat, in its value, and strenuously urge upon our farmers to obtain some of this seed, if ever so small a portion, in order to give it a trial; and as the lot on sale is small, to prevent disappointment no delay should be had in the application, as it will no doubt be speedily disposed of. The peculiarities of this wheat will be found noticed in our July number, and in the advertisement to which we have referred, from information obtained from Mr. Z., who has given us a similar statement when recently in our city. He thinks that on lands suited to the growing of white wheat, it will be found peculiarly valuable.

Since the above was prepared, we have received the following from Mr. Zollickoffer:

LAUDERDALE, *July* 21, 1845.

DEAR SIR: Enclosed you will find a few of the remarkable *beards* or awns of a variety of wheat of which I made mention when I was with you last. This, with several others, I received from H. M. Zollickoffer, of Philadelphia, who received them in a distribution made by the councils of that city of various specimens collected for Girard college. Nearly all of them failed from their late ripening. One variety of spring wheat (labelled Italian) I still retain for further trial. It is a bald or beardless wheat. It is of a compact headed variety, *(triticum compactum,)* and may yet prove valuable. The above long bearded wheat resembles somewhat in its *ear* and *awns* a variety of turgid wheat *(triticum turgidum)* I received four years ago from England, but differs very materially in the form and appearance of the grain. This turgid wheat, with two other varieties, subsequently obtained from Lincolnshire, England, with an expectation of getting a kind that would answer for cold clays, were all given up because of their late ripening. I go in for early wheat; hence my preference for Mediterranean and Etrurian. The Etrurian especially I regard as an important acquisition to the wheat grower. It has also the advantages of the early varieties —escaping rust and smut—and is, to say *the least of it*, as productive as *any* variety I ever grew, and more so than any of the white I ever tried. It has moreover maintained its *color* better than any other white variety I ever tried, as white with me has turned red in one season. But to go back

again to our long-bearded variety. I had given it up, with others. Three heads were found among the Etrurian by my youngest son, and perfectly ripe at the time of cutting that grain. How it got there is more than I can tell. I am disposed now to give it another fair trial. The awns I send you as a mere curiosity. When I get a little more time I want to notice that valuable paper of Mr. Naill's. There has been *too little attention* paid to the proper *time and manner* of putting in our wheat crop. I don't mean, by "too little attention," too little pulverizing the earth. The fact is, in many instances we pulverize too much. In this we follow British husbandry in a case that does not suit our climate, and attribute our failures to anything else other than the real cause.

My son has just measured one piece of ground, on which was grown Etrurian wheat, the product of which we know, having threshed it by itself. The result is about twenty-eight bushels per acre. In this piece there are some twenty large apple trees and a large cherry tree. Any person acquainted with the *condition* of the *ground* would pronounce this a larger produce than could have been expected from any other kind of wheat. I am satisfied that it is five or six bushels per acre more than the Mediterranean grown along side of it, under equal circumstances.

Respectfully yours,
DANIEL ZOLLICKOFFER.

Etrurian wheat.—A few days ago we were politely favored with the following letter, from Capt. G. N. Diehl, of the firm of Diehl & Brother, merchants of this city.—*Philadelphia Saturday Courier.*

PHILADELPHIA, *December* 19, 1845.

GENTLEMEN: Having heard of the superior quality of the Stewart or Etrurian wheat, imported into this country by Commodore Charles Stewart, and of its valuable properties, not possessed by any other wheat I have ever heard of—that of ejecting the Hessian fly, and its non-susceptibility to rust—I was induced, in the fall of 1843, to purchase a small quantity from the commodore, which I sent to a relative of mine near Port Penn, Delaware, with the view of testing its quality and comparative product with that of wheat generally grown in that section. It is perhaps proper to observe (as the character of soil in the State of Delaware varies from the heaviest clay to the lightest sandy) that the soil upon which this wheat was sown is of a *cold clayey nature, and not above mediocrity in quality.* I requested my friend to sow it in the same field with his other wheat, giving it no advantage whatever. This was done; and the yield of the Stewart wheat was at the rate of 32½ bushels to the acre, at the standard of 60 pounds to the bushel; while his other wheat, in the same field, only produced 15 bushels to the acre as the average yield. His entire sowing, in the fall of 1844, was of the Stewart wheat, which also produced 32½ bushels to the acre, at the standard weight, and, if nicely cared for, would have yielded from 33 to 34 bushels.

I think this test sufficiently establishes the superior character (the quality is also most beautiful) of the Stewart wheat. In my opinion, it is the very best seed in the country, as it is adapted to any climate and to any soil. Every farmer should supply himself with this seed, as the advantages pe-

cuniarily would be considerable, and to the country immense. The excess, as per statement above, at the present price of wheat, say $1 30 per bushel, would very nearly pay for the land.

Respectfully yours,

G. W. DIEHL.

From the American Farmer.

MAY WHEAT.

A correspondent at Clear Spring, Washington county, Maryland, writes us (June 4) that his May wheat was already filled, and would be ready to cut in ten days, or perhaps sooner. He considers it superior to any other variety.

L. B. Finley, esq., of the Cubb Hill farm, Harford turnpike, near this city, left with us, about the 1st of June, a stalk of wheat six feet high, which he considered a fair average of a six-acre field. Mr. F. informs us that when he took charge of this farm, several years ago, it was so poverty stricken that the whole farm, of several hundred acres, would scarcely produce grass sufficient for the support of half a dozen head of cattle. He commenced the burning of lime, and with the refuse of his kilns he has brought his farm into a state of tilth which would bear comparison with the boasted farms of Lancaster or Chester county.

From the Genesee Farmer.

CHARCOAL FOR WHEAT.

By all means remember that it is far better to sow but five acres, and so feed the plants that they will give you 40 bushels per acre, than to sow fifteen acres and starve the young wheat plants down to 12 bushels per acre, and have even that badly shrunken with rust. Don't forget that it takes less seed, and fewer hard days' work, to raise 200 bushels on *six*, than on *fifteen* acres of land.

Nothing is more common in western New York, Pennsylvania, and Ohio, than for land to be too rich in vegetable mould to bring good wheat. The straw grows too rank and thick, and is very liable to be affected by rust. To prevent this latter malady, Mr. Haywood, of Buffalo, has used charcoal with signal success. Mr. H. is the owner of a tract of splendid wheat land near Sandusky, Ohio, where he has two flouring mills. He has kindly furnished us with a plot of seven wheat fields, taken for experiments this season, with the results which follow:

No. 1—20 acres; applied fifty bushels of coal, ground fine, per acre; yield 25 bushels per acre.

No. 2—4 acres, no coal applied; wheat badly rusted; yield 5 bushels per acre.

No. 3—15 acres; coal as in No. 1; yield 25 bushels per acre.

No. 4—25 acres; coal as in No. 1; yield 35 bushels per acre.

No. 5—15 acres; coal; yield 25 bushels per acre.

No. 6—8 acres; no coal; yield 5 bushels per acre.

No. 7—6 acres; no coal; yield 3 bushels per acre.

Note.—No. 4 was seeded with *old* wheat.

The soil, culture, &c., were precisely alike, except the use of fifty bushels of coal per acre, as designated—sown in April and May. The soil abounds in lime and organic matter.

Mr. Haywood will apply 10,000 bushels of coal to the fields to be sown in wheat this autumn. It costs him $30 per 1,000 bushels. He grinds it in a common bark mill, used by tanners.

For the Farmer and Mechanic.

CHARCOAL FOR WHEAT AND RYE.

Gentlemen: In fulfilment of my promise, I communicate the following statement of some of the results of my inquiries in relation to the beneficial effects of charcoal as a fertilizer, and as a preventive of shrinkage in winter grain.

Mr. Holloway, of Hancock, Delaware county, informed me that he had heard his father remark that he had never known land to wear out where there had been a coal-pit; but that such places always produced better than the adjoining land. It may be well to remark here, that in some instances I have been told that the burning of a coal-pit had for a while destroyed the fertility on the immediate site of the pit. But this may be owing to excessive burning of the soil, or too great quantity of the coal. We would not expect a crop from seed sown in a heap of lime or silica. Almost all of whom I have inquired confirm the account of Holloway as to its uses as a fertilizer, and its durability. I will state but one of a number of facts proving its benefit in increasing vegetation, besides the luxuriant growth on the sites of coal-pits.

An aged and credible man, Mr. Dow, of Chehocton, in Delaware county, said that some years ago, when living at a place called Butternuts, he purchased a load of charcoal to use in a small furnace. The man who brought it, in passing though a piece of ground, occupied as a garden, upset his load. They gathered up all they could, but much fine coal was left. Mr. Dow and his wife both said that it was astonishing to see the increased vegetation to the extent of where the coal was left. They say it was a moist soil.

These, and a number of facts, the result of much inquiry on the subject, have convinced me that coal can be profitably used as a fertilizer. But it is peculiarly valuable as a preventive of rust and shrinkage in wheat and rye. In proof of which, Colonel Holliday, of Colchester, Delaware county, a reputable man, well esteemed for truth, who was himself a blacksmith, and whose father had followed the same trade, and had burnt many coal-pits, told me that he had made the remark to his father that he had never known grain to be shrunk where there had been a coal pit. Last year, my son-in-law, Henry Woolsey, of Deerpark, in Orange county, said he had a piece of rye much shrunk, and of little value except where there had been a coal-pit, where it was plump and fair. Many other facts have come to my knowledge confirming my opinion that charcoal may be used so as to greatly increase the profits of farming, and particularly where wood is abundant. But as there has, as yet, been little experience on the subject, I would suggest that every farmer who reads this should try the experiment, at least in a small way. Almost any one can procure a little, (if only a bushel;) try it in different proportions; observe the nature of the soil; and, if possible, compare the effect of coal

from different kinds of wood—if those containing more potash are better; and if so, what soils, &c. Some (as the coal from hemlock) contain little or no ash; if such are beneficial, it proves pure carbon to be indeed a manure.

Respectfully yours,

HENRY V. KLEEIT.

From the Mark Lane Express.

EGYPTIAN MUMMY WHEAT.

Mr. Nairne, St. Ford-cottage, Elie, writes to the *Fife Journal*, in reference to some experiments with grains of this wheat. Mrs. Batson, Horseheath, got a return of 1,700 fold; Mr. Whyte, Melville, 2,500 fold. With respect to himself, he says, I dibbled in the seeds myself—a single pickle in each hole; and as the crop got tall, and just as the ears were in bloom, I put aside the netting, and counted the number of ears from each root or pickle in three instances, in each of which there were 14, 22, and 26 ears; and three of the five ears which Mrs. Batson on three occasions sent to me produced 44, 48, and 56 grains; thus averaging 49⅓ grains each—say 50. By multiplying this by the average of the three ears, 20⅔—say 21—we have the result of 1,050 fold. He adds: in the hope and expectation that this new species of "the staff of life," from the banks of the Nile, so celebrated for its fertility, might prove an important acquisition to Scottish agriculture, I sent 202 grains of my last year's crop (I had only 204) to 16 friends, and 4,357 of this year's to 97 friends—in all 4,559 grains to 113 friends—thus averaging 40 grains to each; and my distribution has been into 17 counties, viz: Ayr, Berwick, Bute, Dumfries, Edinburgh, Fife, Forfar, Haddington, Kirkcudbright, Kinross, Lanark, Linlithgow, Perth, Peebles, Roxburgh, Renfrew, and Selkirk.

To the Editor of the Cultivator.

WHEAT CULTURE.

At one of the weekly agricultural meetings held during the past winter, the subject of discussion was the culture of wheat. Mr. McVean, a member of the assembly from Monroe county, made some very interesting and valuable remarks, which, at our request, he has furnished us for publication.

In offering a few remarks (said Mr. McVean) on the cultivation of wheat, I deem it most proper—deferring the minor details of special cultivation, manures, diseases, and different varieties—to introduce the subject by an exposition of the general principles and circumstances of soil, natural adaptation and climate, which will ever control the production of this most important crop.

An examination of the geological map of the State will at once and most readily indicate to the intelligent observer what portions of the State are most naturally adapted to wheat.

First in value, and occupying a large surface, is the Onondaga salt group. The rocks of this group are sometimes denominated the gypseous limestone, or shales; connected with which are the plaster quarries,

the water lime, and the salines of the State. This group, as a whole, embraces the most natural and enduring wheat soil of the State. It includes and extends from Grand island eastward, narrowing to a point in the county of Schoharie. Its soil is composed of diluvial swells, chiefly resulting from and based upon the limestone—a sub-soil susceptible of fertility at any depth, and which, with the substratum of lime rock, is adapted to absorb the superabundant moisture. Hard water, a prevalent growth of oak timber, also upon much of its southern line a comparative absence of vegetable accumulation, and often of timber, consequent upon the annual burning of its natural product, the opening grass, characterize this group. With a surface at once beautiful and accessible, few portions of the State presented a more unpromising *appearance of soil* to the first settler. It's unsurpassed and permanent value has been demonstrated by time and experience, and it is due to the mineral character of its soil, and the fertility and adaptation of the sub-soil.

Although I have dwelt upon this group more at large, because of its natural peculiarities, I am far from claiming for it exclusive natural adaptation to wheat; and only mean to say that it is more generally and permanently adapted than any other, as a whole; that as a whole, it is more certain and enduring, and better resists every unfavorable vicissitude of season, climate, or defective cultivation; and that under continued cultivation, there has been little if any falling off in its annual product of wheat, except when managed with great imprudence.

I am aware that there are large portions of superior wheat soil embraced in the collateral goelogical groups, very much of which is but little if at all inferior to the above in natural adaptation to wheat.

Of these, extending north to lake Ontario, are the Niagara, Clinton, and Medina groups; and towards the south, the Helderberg, Hamilton, and of the Chemung group, more or less of the northern portion, according to the extent of the northern lime drift; for it is an important fact that the diluvial current from the north has conveyed and intermixed beneficially the rock of each of these groups with all the others; conveying the fertilizing lime far south of the actual existence of the rock, in place. These various groups contain collectively a very large portion, perhaps one-fourth, and the most valuable soil of the State.

When the important question arises, where have occurred, and to what causes are due, the evident and conceded diminution of the wheat crop of the State? it will be found that it has occurred chiefly in the last-mentioned groups, and generally in the ratio of their distance from the first; owing, in some instances, to the deficiency of lime, deficient mineral qualities, and excess of vegetable matter and humus in the soil; very frequently to the too level and wet surface; but more specially and injuriously to the tenacity and imperfection of the sub-soil; resisting the escape of the superabundant moisture, whereby large surfaces are often super-saturated with water, inducing winter-kill, debility, and various diseases of the plant, especially under the action of sudden and extreme frost, or heat and drought. Collectively, these results become more manifest and injurious, as the soil has been retained under long continued cultivation, so that only in the most favorable seasons can a full crop be realized in much of these soils; and in these have occurred the principal falling off in the wheat product of the State.

As there are large portions of soil thus circumstanced in the wheat re-

gion of the State, and especially in the last named groups, it follows, if the premises are correct, that in no way can the area of wheat growing be so advantageously extended, in no way can capital and means be so profitably applied, as in improving and adapting these lands, by open and thorough draining, where the mineral qualities of the soil are in other respects proper. It is an indisputable fact, that very large surfaces under cultivation scarcely yield a remunerating return, from the causes here indicated.

In further illustration, and in order to a more comprehensive view of the whole subject, as connected with the above general principles, I desire to remark briefly upon the influence of climate upon the production of wheat, as I am not aware that the importance of the subject is generally appreciated.

Perhaps there is not on earth a better wheat soil than is to be found in New York, so far as the natural capability of the soil is concerned; and yet it is only when the most favorable circumstances of season and temperature combine with a proper condition of the soil that we obtain products approaching those of Great Britain, from lands under no better cultivation, and inferior in natural adaptation to ours. The cause of this is to be found in the excessive character of our climate. Our growing crop has to surmount the extreme severity of our winter, and the more injurious and frequent spring frosts, acting upon a wet surface, producing what is called winter-kill; the succeeding heat and drought acting with sudden change on the same wet surface, upon a plant flourishing only in a dry soil, and naturally incapable of resisting these adverse conditions; and, finally, encountering the excessive heats of summer, (often in connexion with moisture,) stimulating the plant to premature and diseased ripeness. Or, if the foliage is very dense, enfeebling and lodging it, so that the grain is deficient in proportion to the straw. It is a frequent occurrence that the crop is heavier than can be carried to profitable maturity, under the influence of our climate; and practical farmers have long since learned that crops of a medium weight are generally the most profitable.

The influences of climate apply not only to this State, but with more or less injurious force to all the United States, in one extreme or the other of heat or cold; and it is probable, that in the southwestern States of the Union the cultivation of wheat is limited more by the influence of climate than by imperfection of soil.

In accordance with the above principles, and for the reason assigned, it will be always practicable on equal, or even inferior conditions of the soil, to raise heavier crops where the climate is more temperate and uniform; for the reason, in addition to those stated, that the crop occupies the soil a much longer time in arriving at maturity, and it is also less subject to the adverse vicissitudes and influences alluded to. This is believed to be the case in some parts of Europe and in Great Britain, in which last the crop generally occupies the soil in growing state, excluding the fall and winter, from the first of March to the middle of August; but doubtless its insular position has a favorable influence. In such climates, also, it is more practicable, for the same reasons, to carry down the cultivation of wheat to soils of inferior natural adaptation.

As the influence of climate is a fixed condition, and little subject to human agency, our alternative is to adapt our soil to the climate; and this

we may do chiefly by laying the land dry, and obviating on a large extent of our soil the injurious effects of superabundant moisture.

In clearing new land, the importance and economy of retaining, or even planting, at proper intervals, narrow belts of timber, as protection against the winter winds, will engage the attention of practical men. The white oak, which retains its leaves through the winter, is admirably suited for this purpose, and indigenous to the soil.

In continuation, it may be remarked that the winter frost, and heat, and drought of our summers, while offering superior advantages for cultivating and subduing the fallows, affect injuriously at the same time the growing crop, especially in wet and heavy soils; urging their drainage also from the consideration that they are afterwards more easily and seasonably tilled, and more productive of all other crops, as well as wheat.

The additional conclusions resulting from these general views and principles, are, that the first requisite, in the cultivation of wheat, is to obtain a good soil; that a good soil is one that abounds in lime, is clean and dry, and right in the mixture and quality of its mineral matter, including fertility and absorbent qualities of the sub-soil; that a soil containing vegetable fibre or humus in excess produces much straw and little grain, and that consequently alluvial soils are not well adapted to wheat, except when naturally overlaid by a proper mixture of the neighboring upland minerals; that there is much unprofitable application of labor and capital, because of non-conformity to the natural laws of soil and climate; that the cultivation of wheat may be profitably continued or extended on large portions of our land, by adapting the soil to the climate; and thus to the cultivation of wheat, on lands that are too level or wet, provided the mineral qualities of the soil are correct in other respects.

I would finally offer the suggestion to practical men, that, as good wheat lands are well adapted to the production of nutritious pasturage, it will be found most profitable, at the relative prices of products and labor, to renovate the soil to a greater extent than is now practised, by rendering pasturage accessary to the cultivation of wheat in preference to costly or artificial manures, beyond a judicial economy and application of those that accumulate on the farm, and that lands not natural to wheat will be most profitably applied to other crops.

From the Ohio Cultivator.

OHIO WHEAT CROP FOR NEXT YEAR.

We venture to predict, that if no unusual injury befalls the wheat crop now in the ground, the yield of the coming year in this State will be greater than for three years past, if not greater than was ever before produced. Our reasons for this opinion are the following:

1. *The general drought* during the past summer and fall will be found to have had a very beneficial effect on the soil of summer-fallows, not only in destroying the grass and weeds more effectually than usual, but in effecting chemical changes in the elements of the soil, by which means the peculiar food of the wheat plant is rendered more soluble and abundant.

2. The present wheat crop was generally better got in than any preceding one for a number of years past. This, we find, is the testimony of

farmers from all parts of the State. The weather during the fall was remarkably fine for this work, and, in the principal wheat counties, the partial failure of crops gave farmers more time for performing the work well. They also had more land unoccupied, so that a greater number of acres have been sown.

3. Farmers have also been led to bestow more study and attention to the *science* of wheat farming, and to discover the means of increasing the productiveness of their lands. This has led them to adopt a variety of improvements, which will be found greatly beneficial in many cases, and instructive in all. Indeed, we hear from all quarters of the State that the farmers have been trying a multitude of *experiments* in regard to the wheat crop this fall, suggested by the Ohio Cultivator; and when the results of these experiments are published, as they will be in our pages after harvest, next year, the instruction they will impart respecting the culture and improvement of this great staple of Ohio will be worth MILLIONS OF DOLLARS to our readers and to the State.

From the Ohio Cultivator.

EXPERIMENTS IN WHEAT CULTURE.

Benefits of agricultural improvements in Ohio.

The following are some of the experiments and improvements in the cultivation of wheat, to which allusion has been made, and the results of which will be made known through the columns of the Ohio Cultivator after next harvest:

1. *Previous crops.*—Some farmers have sown part of their wheat after summer-fallow, and the rest after frosted wheat, or after oats; others (in the central and southern parts of the State) after corn cut off, and a part among standing corn, with various modes of covering, so as to test the difference as to winter-killing, &c.

2. *In the preparation of land* there have been a great number of improvements adopted, or experiments tried, such as more frequent or extra deep plowing, sub-soiling, under-draining, harrowing, rolling, &c.; also in manuring or enriching the land with lime, ashes, plaster, charcoal, &c. The results of this class of experiments cannot fail to be vastly useful.

3. *New varieties of seed* have been sown to a greater extent than ever before, in nearly all parts of the State. We know of quite a number of farmers who obtained seed from New York and other States, and some have sown as many as from six to ten different varieties for the sake of experiment and comparison. One farmer in this (Franklin) county has sown 150 acres of wheat, consisting of ten varieties—three of these were obtained direct from England, one from France, one from Canada, others from New York and other States of the Union.

4. *Preparation of the seed* with brine, lime, &c., has been practised in a larger number of cases than ever before, and a number of farmers have prepared a part of their seed, and sown the rest without preparation, so as to test the merits of the practice.

5. *The manner of putting in wheat* has been varied more the past fall than ever before, mainly with a view to protect the young plants from winter-killing. Thus some farmers have harrowed in a portion in the usual

way, after sowing on a ploughed surface, and ploughed in other portions, then harrowed a part of the ground smooth, and left another portion rough. Others have *ribbed* the land, as practised by Mr. Noble, of Stark county, so as to have the seed fall in drills, as mentioned in our paper of September 1st, and a few have tried drilling in the seed with a machine constructed for the purpose.

Who can estimate the importance of the instruction that may be derived from all these experiments, when the results are made known, as they will be? And then, too, this is only just the beginning of this great march of improvement. Let the State board of agriculture and the county societies be organized and efficiently sustained, as provided for in the bill now before the general assembly, and such experiments will be multiplied, another year, more than ten fold, and the results will be made known to multitudes of farmers, who cannot be reached by the means now in operation. Who is there so blind as not to see that such improvements in the culture of the staple crops of the State as would be effected by these means would soon increase our surplus products and the revenues of the public works so as to return to the State treasury, many hundred fold, the sum that is asked to be expended in the promotion of these objects? So that instead of the impoverished condition of our State finances being a valid reason for withholding this appropriation, it is, in fact, the greatest reason why the appropriation should be made.

Much might also be said on the benefits that such improvements in agriculture confer on individuals, in the increase of prosperity, and the consequent means of physical, intellectual, and moral progress; but time and space and the patience of our readers forbid any enlargement on these topics at present.

For the Prairie Farmer.

MOWING WHEAT, &c.

BY JAMES M. GOODHUE.

Messrs. Editors: Have any of your readers ever tried the effect of mowing their wheat in the spring? The experiment has been made this season, with such decided success, by some of the farmers in this neighborhood, that I wish you to be informed of the results. Mr. Ashley had a field of winter wheat, growing on the bottom land of the Grant river—a stream much like the Du Page. In the spring, when the wheat had grown to the height of seven or eight inches, and being thickly interspersed with weeds, it was evidently too luxuriant, and threatened to be a mere mass of lodged straw, with heads that would never fill; and, in short, not worth harvesting. He took a scythe and mowed the greater part of the field. The part of the field thus mowed produced a fine crop of clean, straight, well-filled wheat, entirely free from weeds. The remainder of the field, at the same time, was badly lodged, green, rusty—and, in fact, not worth harvesting.

Mr. Reed, of our place, has tried the same experiment with spring wheat; and with similar results.

The advantage resulting from mowing wheat in the spring, I suppose, is principally that you thereby give the light and heat of the sun access to

the earth and to the roots of the plant. It is plain that wheat will thrive best *without a blanket on*, in summer.

Would not mowing also destroy the Hessian fly effectually—that is, the larvæ of the fly, deposited under the leaf?* It might be worth the trial where the Hessian fly prevails.

Mowing wheat, as above mentioned, is nothing new in husbandry; but, I believe, like a great many other useful facts in husbandry, it is new in *our* part of the world. I find reference made to the practice of mowing wheat, in the following extract from "The Comple*at* Body of Husbandry," published in England one hundred years ago; by which extract, it will also appear that the *old chaps* who were then living knew at least the *alphabet* of wheat-growing—and more than could be expected, considering how far they lived from Fox river.

Page 356: "Mr. Yelverton, in 1742, had the prize in Ireland, having six hundred and sixty-eight stone and eleven pounds (153 bushels and 32 hundredths) of wheat off of one acre.† The method he took was to change his seed; then he sowed it not too thick; and he *mowed* it."

After which follows some further account of Mr. Yelverton's method. In fact, by referring to the work above quoted, I find we are in our own day and country only trying over again experiments and methods long since proved and practised in English husbandry.

A few words more, and I will close this hasty communication, already perhaps too long. Mr. Jesse Miles sowed his field of oat stubble, and another of corn stubble, at the same time with winter wheat. The oats that had scattered in harvest sprouted above his wheat, and formed a protection for it through the winter. None of the wheat sowed on the oat stubble was winter killed; while much of that sowed amongst the corn froze out. I have this information from Mr. Miles, who is a man of truth. He believes that if oats are sowed with winter wheat, enough to form an overgrowth, there is no danger of wheat being winter killed.

LANCASTER, *Grant county, Wisconsin, August*, 1845.

For the Prairie Farmer.

HEDGE ROW WHEAT—EARLY SOWING.

BY R. J. CROSS.

MESSRS. EDITORS: The farmers through this section of the country have about finished cutting their grain; much of it, however, is yet in the field, and not secured; but this week, if we continue to have fine weather, will finish stacking or housing nearly all of it. A better quality of wheat, both fall and spring, was never raised on Rock river. In some instances the quantity may have fallen short of the expectations of some; but the berry is as good as could have been anticipated. For spring wheat we are raising here mostly hedge row wheat; the head is quite short, with a long beard, and looks, when growing, much like barley. The grains in the head are quite thick, and are short and plump, and weigh heavy. It is driving out all other kinds of spring wheat from this neighborhood.

---

* The eggs of the fly are deposited on the leaf.

† An Irish acre = $1\frac{5}{8}$ English.

Yourself and correspondents have been continually recommending sowing winter wheat early. Now, I agree with you that wheat should be sowed early, but experience has taught me that it may be sowed too early. I had this season a field of thirty acres of prairie, broken last season. The piece was sowed on shares; I had the centre fifteen acres, leaving five acres on the south of mine, and ten on the north. I sowed the same kind of seed, and limed mine, which was not done by the others. When we came to harvest, I found the east part of mine some four or five days later, shorter straw, and poorer wheat than that on the north or south; but on the west side there was no perceptible difference. I can only account for the difference that that part of mine which was inferior to the other was sown about the 25th of August; that adjoining on three sides the first week in September. Four years ago I observed the same difference in wheat sown in August or early in September. I intend this year to sow from the first to the tenth of September, but not earlier. Spring wheat I do not believe can be sowed too early.

Roscoe, *28th July*, 1845.

There is now and then a season when late spring wheat succeeds better than early. Such a case is, however, an exception.—Editor.

From the Ohio Cultivator.

THE PROPER TIME FOR SOWING WHEAT.

Mr. Bateham: There are, in this section, many different and contradictory opinions respecting the proper time for sowing wheat. A large majority of the best farmers of this latitude concur in the opinion that the best time is from the 15th to the 25th of September; that period being sufficiently late to avoid the depredations of the fly, and likewise early enough to enable the grain to ripen before it will be liable to be attacked by rust.

But there are a few others, intelligent farmers too, who are in favor of sowing about the 1st of September, so as to enable the grain to root deeply and firmly, thereby enabling it the better to withstand the severity of the February and March frosts; arguing, also, that, being sowed thus early, it will have time to outgrow the attacks of the fly. It is further maintained that, by early sowing, the growth will be sufficiently large to admit of its being pastured when the ground is hard frozen in the winter. But, while it is argued by some that wheat, which obtains a heavy growth in the fall, may be fed off without injury in the winter, it is maintained by others that it can never be fed off without serious injury, by producing a feeble growth, "turning the wheat to chess," &c.

Taking into consideration the fact that our meadows have not, on the average, turned off one-fourth their usual quantity of hay this season; and also the fact that the straw off our frozen wheat will not be fit for cattle to eat; and still another important fact, that the best possible pains in saving all our turnips and corn fodder cannot supply the deficiency, it will be very desirable to adopt the plan of early sowing, with reference to winter pasture, if it can be done with safety.

You will confer a particular favor by giving us your opinion respecting these matters.

Yours, &c.,

G. R.

EASTPORT, *Tuscarawas county, Ohio, August*, 1845.

P. S.—Perhaps you can inform us at what particular time in the moon the sowing ought to be done; also the time in the moon for pasturing, so as to render the plan perfectly safe. Please to be especially serious (!) in regard to this matter.

G. R.

Remarks.—In regard to the time of sowing wheat, it is of course impossible to lay down any exact rule that will apply to all parts of this country or this State, with all the diversities of soil and climate, and the differences in respect to the liability to injury from the fly and other casualties. In the north part of this State, and in western New York, from the 10th to the 20th of September is generally considered the most suitable time. In central and southern Ohio, and in other regions of mild climate, the latter part of September or the first week in October is considered the best time. Our own opinion is founded on but slight observations, as yet, in this climate; but, from what we have learned, we are in favor of early sowing, then feeding off with sheep in the fall, if attacked with fly, and at any rate in the latter part of winter, or early in the spring.

As to sowing or pasturing "in the moon," we have no correspondents or subscribers in that satellite as yet, and therefore cannot give any definite information concerning its agriculture!

EXPERIMENTS IN WHEAT CULTURE.

To the Editor of the American Farmer:

SIR: Owing to the drought during the autumn of 1842, the crop of 1843 came forward very irregularly, and ripened in the same manner. That which had vegetated promptly was well matured, that which vegetated later was severely injured by the rust, and that which vegetated during the winter was entirely lost. I had sown my crop a shade later than I otherwise should have done, through fear of an excessive growth during the fall, on account of the *warmth of the earth*—an offence against good husbandry I shall endeavor to avoid as far as possible in the future.

I had observed during the fall that the grain upon the warm exposures about the fields had vegetated more uniformly, and showed a better growth than the surface generally, upon which it was evident much of the seed had not vegetated, notwithstanding the fineness of the weather, until the middle of November, when the weather became unusually cold for that season of the year.

My crop had been sown from the 24th September to the 22d October with the exception of two bushels reserved for an experiment upon the habits of a certain variety of wheat. Fine showers fell on the 18th and 22d, and on the 25th a deeply soaking rain; on the 27th I sowed the two bushels of wheat upon rich potato ground, ploughed just before the rain

on the 25th. It did not vegetate until January, when it came up very beautifully, the thermometer, on the 20th of that month, standing at 67°. About the beginning of February it became very cold, and the ground was deeply frozen in the absence of snow—in March, also, the thermometer sunk to zero; my experiment failed—the wheat entirely perished, which no doubt was the fate of much, if not all, of that portion of the crop which came up in January.

The crop ripened from the 15th to the 25th of July, some three weeks too late. The fate of the crop had certainly depended upon the circumstance of its early vegetation.

The inquiry, could anything have been done which would have promoted the early growth of the crop? presented itself for consideration. How had each field been prepared; in what state of cultivation as to fineness and looseness; what had been manured, and in what manner; what not; when sown, &c.? were all reviewed, and the result appeared to be pretty much as follows: 1. The vegetation of the crop. *First.* That land which had been prepared earliest, whether ploughed once or twice, and had had some rain and was well settled, whether dunged or not, vegetated best; *perhaps because it had retained most moisture, and grew best because it absorbed less of the fall rains, and retained most heat*, as a cloverfield ploughed early and not stirred—merely worked on top. *Second.* Fields that had been stirred or ploughed late stood next; *perhaps, because of their looseness, they were more exposed to loss of moisture by evaporation during the drought, and of their heat through the same medium after the fall rains. Third.* My experiment, although entirely accidental in this connexion, served to show that there was a point of time during the fall after which the crop ceased to vegetate, and during the winter a degree of cold, or other circumstances, which destroyed the plant, not *before*, but *after* it had vegetated.

2. The growth of the crop. That portion of the earlier sown grain which vegetated promptly was considerably in advance of the great bulk of the crop, the whole of which, however, did not improve as much as it was reasonable to expect prior to the commencement of cold weather. From which it would appear that the rain on the 18th and 22d exerted great power in causing the germination of much of the grain sown previously, which, I suppose, was owing to the great quantity of heat then yet remaining in the soil, but considerably reduced by evaporation during and after those rains, and so far reduced by the rain of the 25th as to retard the growth of the whole crop, and entirely prevent the germination of all grain grown subsequently, as certainly was the case in the experiment; which ground being fresh ploughed, gave it the greatest possible capacity to absorb water, which, combining with the remaining heat, passed it off in vapor, and reduced the temperature of the earth below the germinating point, from which it did not recover until the warm weather in January, when the infant plant came forth but to be destroyed by another element of destruction growing out of the great absorbent power of the loose soil—*its expansion when frozen*—which expansion would be in proportion to the quantity of water contained in the soil. The cold in November and December, and in the early part of January, had not destroyed the germ, but the cold in February or March destroyed the plant. If, then, the soil had been ploughed early, had been well settled by rains or the use of the roller, and top dressed (the proper place, I apprehend, for all

fermented manure, instead of stirring in) as far as manured in the fall, and put in with shovel ploughs, cultivators, or harrows, *moisture* sufficient to cause the vegetation of the crop might probably have been retained; and, by proper attention to top-draining, so as to throw the excess of water promptly off the fields during rains after seeding, much heat might have been retained to assist the fall growth, and to prevent injurious expansions by freezing during the winter. I have conformed as nearly as I could to the above view of the subject in sowing the crops of 1844-'45. Oat stubble, well ploughed immediately after removing the crop, top-dressed with manure, harrowed, and left to lie till the time of seeding, and put in with the cultivator, more than quadrupled the product of land of the same field stirred for experiment in the crop of 1844. Owing to the unusual mildness of the last winter, the shade of difference in the present crop is not very great, but very perceptible.

The whole may be summed up thus: That land to be sown in winter grains ought to be *well ploughed when in proper order, and well settled by rain or the roller*, previously to seeding, so as to diminish the absorbent power of the soil; to have the full benefit of which, particular attention ought also to be paid to top-draining, so that the excess of water may pass off of the fields as promptly as possible, whereby heat would be retained to promote the fall growth and protect the plants from injurious expansions during severe weather through the winter, when not covered with snow.

The memory of every practical farmer, I have no doubt, will furnish data to sustain the results. If I am mistaken about the causes, I promise myself the pleasure of being corrected; and as it is an affair of "temperature" pretty much, I promise in advance to keep in the best temper. Different soils may no doubt produce somewhat different results, which gentlemen will please recollect.

The soil upon which the above conclusions were arrived at, would be about as follows:

Silex (sand) coarse and fine, and other insoluble matter	75
Alumine, (clay)	4
Oxide of iron	9
Phosphate of magnesia and lime	0.5
Destructible matter at red heat	9
Humus, soluble in alkali, saline and other matters	2.5
	100

D. W. McNAILL.

COTTAGE FARM, *Sams's Creek, Fred. co., Md., June,* 1845.

PREPARATION FOR SOWING WHEAT.

The following communication from R. T. Underhill, M. D., on the subject of "the preparation of ground and seed for the wheat crop," was read and ordered for publication. It was an interesting practical instruction on that very important subject:

New York, *September* 2, 1845.

My Dear Friend: Being engaged to attend the meeting called for this day in the town of Greenburg, to form a "Farmers' Club" in that town, in accordance with the constitution and by-laws of the Society of Agriculture and Horticulture of Westchester county, I shall not be able to attend the discussions at the New York Farmers' Club on the subjects proposed at the last meeting—"The preparation of the ground and the seed for the wheat crop," &c.

The wheat crop is so valuable, so intimately connected with the prosperity of not only the agricultural, but also the manufacturing, mechanical, and commercial interests of the whole country, that we cannot be too well informed on the subject. Land that has been well manured in a previously cultivated crop, such as corn and potatoes, is, with proper ploughing and harrowing, very suitable for winter wheat. It is always best that the manure should have been applied in the previous crop, particularly if it is rank or recently formed; or your wheat will produce too much straw, be weak, and fall down. There are a few exceptions to this rule. Bone dust, oily fish, street manure, &c., have often been applied at the time of sowing, to secure a good crop. A sandy loam, with a good supply of calcareous earth or lime, forms the best soil for wheat—a certain amount of sand or silex, clay, and lime, being essential to secure a good crop. When I say that the land should be thoroughly ploughed three or four times, and harrowed as often, I am fully aware of what is the usual practice, and also of the loss sustained by only one ploughing and two harrowings. I do not apply these observations to land just cleared from the forest, (though then, the more and better the ploughing, the larger the crop,) or the prairie sod just turned over, but to the land in all the old States, and all lands long under cultivation. The object in ploughing the ground so much, is to turn under more completely atmospheric air, which consists of nitrogen, oxygen, and carbonic acid, a thorough mechanical mixture of which with the soil will insure a great increase of crop; it also acts as a manure. The thorough pulverizing of the soil, so as to make it fine, is secured in this way, which renders it so much better for the fine roots in the early growth of the plant to get well rooted before winter sets in, thus securing it from being winter-killed. This also enables you to pasture your sheep and young cattle upon it in the fore part of November without any fear of pulling it up. They will secure it from the Hessian fly by eating off the larvæ.

It is also very important to prepare the seed properly; you should have the most plump and clean seed that can be obtained. Six shillings or a dollar more per bushel for the best of seed is no consideration, when the advantages are taken into the account. In a barrel or half hogshead make a brine that will bear an egg, from the old salt taken from your meat and fish casks; or, if you have not saved this, ordinary fine or coarse salt, the former dissolving much the soonest, and is generally preferred for that reason. Put in one, two, or three bushels of wheat, and mix well with the brine, and skim off all the chess and other foul seed and light wheat that rises to the top. There should be brine enough to cover the wheat three inches deep. Stir up the wheat with a stick occasionally, and let it remain in the brine three or four hours. Some persons let it remain all night; but I think there is some danger of swelling the grain and acting upon the farina too much by leaving it so long in the brine, and there is

no real necessity for it. Draw off the brine into another cask, and lay the wheat on an oblique surface, so that the brine may draw off; then to every bushel of wheat add three or four quarts of fine air-slacked lime, and rake and shovel it through every part, so that every grain is coated with the lime, and the seed as much separated as possible from each other. (Some good farmers use more lime than the above.) If you have not lime, and cannot readily obtain it, use unleached wood ashes instead. You must measure your wheat before you prepare it, or you will likely, when you sow it, put less seed in than is proper. You will also find it difficult, from the increased bulk, to hold enough each time in the hand. It is, therefore, better to sow twice, and at right angles; that is, take rather less than usual in the hand, and when you have gone over the field, begin and sow it over again in the same direction, (across the first sowing.) You will thus have it more even, and secure sufficient seed, which is rarely the case. When you have taken pains to prepare your land well, use plenty of good seed—a virtue rarely practised in this part of the world. The object gained by the above preparation of the seed is, first, you destroy all the smut, which is a parasitical plant placed on the furzy end of the grain; also all the eggs of insects, that frequently may be seen with a glass on the same part of the grain. The salt and lime also act as a manure to stimulate the germ of the young plant, so as greatly to invigorate it in the early stage of its growth.

Yours, truly,

R. T. UNDERHILL, M. D.

H. Meigs, Esq.,
Secretary N. Y. Farmers' Club.

RAISING WHEAT IN NEW JERSEY.

I will suggest the inquiry whether the culture of wheat might not be improved in this and adjoining counties, where the soil is somewhat wet and clayey, by adopting the Canadian mode of summer tilling; ploughing light the first time, and the second time running the plough one or two inches below the first, and laying the land off into narrow beds or lands—ploughing up and down instead of sideways of any elevation in the ground, and taking care to keep open the furrow between the lands, that the water in fall and spring may be carried off, and not left to stand upon and kill the wheat. This is almost the universal practice in Upper Canada, upon moist clay lands, with a thin soil above the clay, where the farms are more noted for good wheat than in any other part of the province. Their new lands produce better and more wheat after a few ploughings, and several crops have been taken off. The first crop the straw has too rank a growth. E. P.

Essex County, *N. J.*

PROLIFIC WHEAT.

In the harvest of 1840, Mr. C. Spring, of Soham, Cambridgeshire, gathered from one of his fields eighteen very fine ears of wheat, (which were five, six, and seven set) the proceed of which filled a common wine glass. The above was planted the following autumn, and

produced one peck; which was again planted Nov. 3, 1841, and produced seven bushels and one peck; planted the same Nov. 2, 1842, the produce one hundred and eight bushels and two pecks; which was again planted in the autumn of 1843, and produced one thousand eight hundred and sixty-eight bushels. Thus the increase from the eighteen ears, in the short space of *four years*, was the enormous quantity of *four hundred and sixty-seven coombs.*

In March last a blade of wheat sprang up in the garden of a poor man at Shipbourne. It was cultivated, and produced 40 ears of corn, having 2,013 grains. Another blade of wheat, of a different description, also sprang up in the same garden, which produced 26 ears of corn, containing 1,392 grains.—*English paper.*

From the Southern Cultivator.

WHEAT-STRAW A SUBSTITUTE FOR FODDER.

This is the season wheat is got out, and I regret to see the straw is thrown out to make manure. I once had a meadow of thirty acres producing good grass, (feather clover and a broad-leafed blue grass,) all of which made a very fine quality of hay.

To save the trouble of feeding, and to furnish shelter for my cattle, I put forks in the ground, and on them placed poles, of such size and at such a distance apart that the cattle could draw hay.

I stacked wheat straw in the same way, generally on the poorest spots in the field. My cattle were turned in and permitted to feed themselves, and at pleasure to use the stacks as shelter, of which they soon learned the advantages. I found my cattle would use the stacks of hay as shelter, but would not eat any of the hay so long as the straw lasted; which proved to me, if they had proper taste, that the straw was more valuable than the hay.

My horses and mules were furnished with hay alone in the stable, on which they showed health and usual thrift. This experiment for some years was observed, and regularly this preference was shown for the straw by the cattle; and they improved and looked better while enjoying the feed on straw, than when they were confined to hay alone, which was as soon as the straw was consumed.

I have never tried to feed the straw alone to horses, but I would not hesitate to say it is worth more than fodder. Try it; save your own straw; it will feed and sustain cattle, horses, and mules, and ultimately make manure more valuable than by the slovenly process of throwing out to rot.

D. REINHARDT.

GREENVILLE, S. C., *June*, 1845.

APPENDIX No. 3.

From the Cultivator.

EXPERIMENTS IN THE CULTURE OF INDIAN CORN.

Mr. Geddes's experiments.

We are indebted to our friend, George Geddes, esq., of Onondaga county, New York, for the following detailed account of several experiments made by him, with great care, the past season, in the culture of Indian corn. They will be read with interest, and our readers will be glad to learn that these experiments will be continued, with the same exactness, the ensuing season. Mr. Geddes says:

The soil is a deposite of gravel, mixed with sand and clay, resting upon a gypseous shale. The previous course of cultivation has been as follows, viz: In 1837, a crop of corn was raised on a heavy sod turned under that spring, and slightly manured with barn-yard manure. The yield was estimated at 65 bushels to the acre. In 1838, corn was again raised, and without any manure; estimated to yield 50 bushels to the acre. In 1839, it was sown with oats, and yielded a very heavy crop. Grass seed was sown with the oats, which succeeded well. The next four years it was pastured. Plaster was put on both corn crops, and on the oats, and once or twice on the pasture.

The ground was ploughed about the first day of May, six inches deep, and planted on the third and fourth days of that month.

The variety of corn was the improved Dutton—that is, Dutton that had been selected from the earliest ears for a series of years.

Experiment No. 1.—One acre was planted in hills three feet apart each way, six kernels in the hill. Fifty loads of half-rotted manure was put on this acre after it was ploughed, and harrowed in as well as it could be done—it being so coarse that it piled up a great deal before the harrow. The hills had a hoe full of the best of the manure drawn in by the planter, and the corn dropped into it. It was hoed twice, and a cultivator was run once along each row *both ways* at *each hoeing*. The account of the cost of cultivation is as follows, viz:

To ploughing and harrowing one acre - - - -	$1 50
50 loads of manure, drawing, and spreading - -	12 50
2 days' work of one man planting - - - -	1 50
cultivating for both hoeings - - - -	50
hoeing twice, 3 days' work - - - - -	2 25
harvesting, 3½ days' work - - - - -	2 63
	$20 88

The product was 70½ bushels: at 4*s.*=$35 25—$20 88=$14 37 for the use of the land; or the corn cost, besides the use of the land, 29.6 cents per bushel.

Experiment No. 2.—The other acre was cultivated as follows: One-tenth was planted in hills three feet by two apart, six kernels in a hill, and *without any manure.* The account of the cost of cultivation is as follows, reduced to acres:

To ploughing and harrowing one acre	$1 50
planting 2 days	1 50
cultivating	50
hoeing twice, 4½ days	3 37
harvesting, 3 days	2 25
	$9 12

The product was sixty and one quarter bushels to the acre: at 4*s.*=$30 12—$9 12=$21 for the use of the land; or the corn cost, besides the use of the land, 15.1 cents per bushel.

Experiment No. 3.—Another tenth was planted the same distance apart, and the same number of kernels in the hill as the last; and was manured by filling each furrow, as it was ploughed, full of barn-yard manure, *unfermented;* the amount used being at the rate of 150 loads to the acre. The cost of production was as follows, reduced to acres:

To ploughing and harrowing one acre	$1 50
2 men to fill the furrows with manure	1 50
2 days' work planting	1 50
4½ days' hoeing	3 37
cultivating	50
3 days' harvesting	2 25
150 loads of coarse manure	18 75
	$29 37

The product was seventy bushels to the acre: at 4*s.*=$35 00—$29 37=$5 63 for the use of the land; or the corn cost, besides the use of the land, 42 cents per bushel.

Experiment No. 4.—Another tenth was planted the same distance apart, and the same number of kernels in the hill as the last, and manured with coarse manure, in the same way; and had, beside, a top dressing of half-rotted manure, at the rate of twenty-five loads to the acre. The cost of production was as follows, reduced to acres:

To ploughing and harrowing one acre	$1 50
150 loads of coarse manure	18 75
25 loads of fine manure	6 25
2 days' work to put manure in furrows	1 50
2 days' planting	1 50
4½ days' hoeing	3 37
cultivating	50
4 days' harvesting	3 00
	$36 37

The product was eighty bushels to the acre: at 4*s.*=$40 00—$36 37=$3 63 for the use of the land; or the corn cost 45.5 cents per bushel, besides the use of the land.

Experiment No. 5.—Another tenth was planted in drills, three feet apart, the corn four inches apart in the drills. It was manured with 25 loads of half-rotted manure to the acre, put on after the ploughing. The cost of production was as follows, reduced to acres:

To ploughing and harrowing one acre - - - -	$1 50
25 loads of manure - - - - - -	6 25
drilling in seed, 4 days - - - - -	3 00
two hoeings, 3 days' work each - - - -	4 50
cultivating - - - - - - -	50
harvesting (small ears) 4 days - - - -	3 00
	$18 75

The product was fifty-five bushels to the acre: at 4*s.*=$27 50—$18 75=$8 75 for the use of the land; or the corn cost 34 cents per bushel, besides the use of the land.

Experiment No. 6.—The remainder of the ground was planted in hills three feet by two feet, six kernels in the hill, with a top dressing of twenty-five loads of half-rotted manure to the acre. The cost of production was as follows, reduced to acres:

To ploughing and harrowing one acre - - - -	$1 50
25 loads of manure - - - - - -	6 25
2 days' work planting - - - - -	1 50
4½ days' hoeing - - - - - -	3 37
cultivating - - - - - - -	50
3¼ days' harvesting - - - - - -	2 44
	$15 56

The product was sixty-five and one-half bushels to the acre: at 4*s.*=$32 75—$15 56=$17 19 for the use of the land; or the corn cost, besides the use of the land, 23.7 cents per bushel.

It is proper to say, that the cost of labor, for such small parcels, is a difficult thing to determine with perfect accuracy.

The stalks being of such equal value upon each piece, I have supposed it unnecessary to attempt any separate measurement; neither have I kept any separate account of the cost of the seed, for the same reason. The whole was plastered, but the expense being so slight, and costing the same for each piece, no account has been made of it. The manure is charged at its full value in each case, though the land is greatly benefited for future purposes. Hardly a quarter of its cost is justly chargeable to this crop. In No. 2 we have an example in which the effects of the manure are easily traced through many years. The last manuring this piece had was in 1837, and it now produced 60¼ bushels to the acre. No charge being made against it for manure, it appears to be profitable above every other experiment. But if the account could be stated for a period of years for each piece of land, as we have it for this year, I doubt not the manure would be found to pay fully all its cost.

These experiments were made chiefly to determine *how thick* corn should be planted; what is the *most convenient form to place the plants;* and whether the manure should be rotted and applied to the surface, or ploughed under unfermented. The conclusion that now appears likely to be arrived at is, that hills three feet by three feet apart, put in rows, so that a cultivator can be used both ways, is the most convenient form for cultivation, and that six kernels put into each hill will make the corn thick enough. I counted, and made examinations that satisfied me that at

harvest my hills averaged five stalks to the hills; no thinning was done except by insects and accidents. That this is not too thick, is proven by experiment No. 6, where the hills were three feet by two feet, the product being 65½ bushels to the acre, and with one-half the manure that was put on No. 1, which was three feet by three feet apart, and the product only five bushels more to the acre. In fact, I believe that more bushels, with the same manuring, would have been raised with the hills two by three feet, than three by three feet; but the extra labor of planting, hoeing, and harvesting, will more than counterbalance the gain.

The labor required to plough under *unfermented* manure, in any considerable quantity, is so great, and its great bulk, compared with its value, making it so expensive to draw; and the fact that it is not felt until late in the season, and that the next ploughing must be deeper in order to bring it all up and mix it with the soil—are great objections to its use. That the next ploughing must be deeper, in order to bring up all the manure, is evident from the consideration that every time the soil is saturated with water it must sink deeper, unless it is held up by some stratum that is impervious to water. If the contents of the barn-yard are piled up in the spring, as soon as the frost is out, and covered with gypsum, so as to prevent the escape of any of its gases, and turned and re-piled at midsummer, and again covered with gypsum, the seeds of weeds will be destroyed, and the manure will be entirely rotted in time to put on the corn the next spring. The manure used in these experiments was but half-rotted, in consequence of neglecting to return and re-pile it. From the decrease of the bulk, the expense of handling and mixing the manure with the earth will be so much lessened as fully to compensate for all the expense of piling and rotting it.

The cost of the gypsum, too, will be but slight, as but little is required—merely enough to whiten the heap. The corn will then have its stimulus at the time it needs it most; and but few weeds will spring up from the manure. All these considerations lead me to prefer fine manure to coarse.

It is worthy of remark that in No. 2, where no manure was used, the yield was 60¼ bushels; in No. 3, where 150 loads of unfermented manure were used, the yield was 70 bushels—a gain of 9¾ bushels, to be ascribed to the manure; in No. 4, with the like amount of unfermented manure, and 25 loads of fine manure, the product was 80 bushels—a gain of 10 bushels, to be ascribed to the fine manure; showing that one load of fine is worth more than six loads of coarse manure: while No. 6, which was manured with the fine only, yielded 65½ bushels—a gain of 5¼ bushels, to be ascribed to the same amount of fine manure; showing that one load of fine is worth about 3¼ of coarse manure. But the land on which No. 6 was raised was not as rich as Nos. 2, 3, and 4; owing to the fact that it was so situated in the field that it had not been as highly manured in those years gone by, when manure was only drawn out of the barnyard "to get rid of it." Nos. 2, 3, and 4, were nearer the gate, and had been served about alike, and furnish the fairest test of the value of the different kinds of manure.

Some of the results obtained by these experiments were unexpected. The highest yield is very far below the great crops that have been reported. I know not why a hundred or more bushels to the acre were not raised on No. 4, with manure both on top and under the furrow, amount-

ing to 150 loads of coarse and 25 loads of fine to the acre; and that, too, alongside of land that, *without any manure*, yielded more than 60 bushels to the acre.

I purpose, the next year, to plant all of this ground with corn, and carefully measure the product of each piece, with a view of learning the effects of this manuring for the second year.

GEO. GEDDES.

W. C. Young's method.

Mr. Young is a Kentucky farmer, and raised 195 bushels of shelled corn to the acre. When this was first published, it quite staggered the faith of eastern farmers. This roused the zeal of Kentucky, and the Dollar Farmer sets forth the manner; and adds a series of explanations, all of which we give. We must say that such a depth, for seed on stiff soils—on an" soil except the lightest and mellowest, and on these in a cool or rainy spring—would not be proper. Neither could planting be done in March in Indiana, unless in the southern part, and then only in early seasons.—*Ed. Ind. Farm. & Gard.*

That Mr. Young did produce 195 bushels to the acre, we feel just as certain as that we now hold a pen in our hand. It was measured by as respectable gentlemen as any in Jessamine county; gentlemen appointed for the purpose by the Jessamine Agricultural Society. And let it be remembered that this was no first experiment on a single acre. The corn was planted and cultivated according to the method long adopted by Mr. Young, and his whole crop was pronounced equal to the five acres measured. This extraordinary crop was produced in 1840, a year very favorable to corn; but we are told by Mr. Young that in the dryest years he does not get less than 100 bushels to the acre.

"My universal rule is to plough my corn land the fall preceding the spring when I plant; and as early in the spring as possible, I cross-plough as deep as circumstances will permit; and as soon as this is done, I commence checking off: the first way with my large ploughs, and the second with my small ones—the checks three feet by three, admitting of working the land both ways. And then I plant my corn from the 20th to the 25th of March—a rule to which I adhere with scrupulous exactness; planting from 8 to 12 grains in each hill, covering the same from *four to six inches deep*—greatly preferring the latter depth. So soon as my corn is up of sufficient height, I start the large harrow directly over the rows, allowing a horse to walk each side; harrowing the way the corn was planted; and on land prepared as above and harrowed as directed, the hoeing part will be so completely performed by this process, that it will satisfy the most skeptical. Then, allowing the corn thus harrowed to remain a few days, I start my small plough with the bar next the corn; and so nicely will this be done, that when a row is thus ploughed, so completely will the intermediate spaces, hills, &c. be lapped in by the loose earth, occasioned by this system of close ploughing, as to render any other work useless for a time. I thin to four stalks upon a hill, never having to transplant, the second ploughing being performed with the mould-board towards the rows of corn; and so rapid has been the growth of the corn between the first

and second ploughings, that this is performed with ease; and when in this stage I consider my crop safe—my general rule being, never to plough my corn more than four times, and harrow once. My practice is to put a field in corn two successive years, then grass it, and let it lie eight years; a rule from which I never deviate. Now, I do not pretend that the labor bestowed upon a sod-field to put it in a state of thorough cultivation does not meet with a fair equivalent from one crop; but I presume no farmer will doubt when I say the second year's crop from sod land is better than the first, with not more than one-half the labor. The best system of farming is to produce the greatest amount of profit from the smallest amount of labor."

Now, what are the essentials of this method?

First—Fertility of soil, kept up by his system of manuring and grass, of which we shall not speak.

Second—Early planting. In consequence of this, the corn matures before the dry season commences, and every farmer knows that plenty of rain will make a good crop of corn in almost any soil. They all know that the essential thing for corn is rain, and there is generally plenty of rain till about the 1st of July. Mr. Young might plant his corn considerably later, and have it come up as early, and grow off more rapidly, by soaking it in a solution of saltpetre. Thus would the effect of frost and chilly mornings be in a degree avoided; while we feel confident, from our own experience, all injury from the cut-worm would be avoided.

Third—Close planting. Every farmer must know that, to produce the heaviest possible crop, a certain number of stalks must be upon the ground. It is often observed that the great sin of American agriculture is too thin sowing. Grass is nearly always sowed too thin, and the same is true of small grain. In England they sow four and five, and sometimes six bushels of oats to the acre; in this country generally not more than a bushel or a bushel and a half. Hence in England they yield three or four times as heavy as in this country; while in this country we never hear of an extraordinary crop where less than three or four bushels to the acre were sown. Now, we venture to affirm that no very large corn crop was ever grown unless it was planted more than usually thick. In the crop of George W. Williams, of Bourbon county, Kentucky, the corn was planted in rows two feet apart, with a stalk every foot in the rows. This crop produced 167 bushels to the acre. But there is another important advantage of close planting. The corn very soon becomes so dense that the ground is shaded, and the growth of the grass is prevented, and the moisture retained in the soil. By this method of cultivation, no grass is ever allowed to absorb the moisture from the earth, or to take up the nutritious gases which ought to be appropriated exclusively to the corn.

Fourth—Deep planting. This probably operates favorably by giving the roots a bedding where the soil is always moist. Another advantage may be that the roots are thus not so liable to be broken by the plough in cultivation. But it must be here noted, that by Mr. Young's method the corn is "laid by" before the roots are so extended as to be liable to much injury from the plough.

Fifth and last.—It will be observed that, by Mr. Young's method the soil is kept very friable and loose, and that to a considerable depth. This may be considered the all-essential point in husbandry. One of the chief advantages of all manures is, so to divide the soil as to make it that the

atmosphere, from which plants derive their principal nutriment, may freely penetrate to the roots of the plants. In such a loose soil, too, it is well known that much less rain is requisite than in the stiff, cold, close soil. For this reason, gravel, sand, or sawdust, is often the best manure that can be put upon a stiff soil. In the fall of the year, Mr. Young turns down very deep a thick rooted sod of eight years' standing. The vegetable matter in the sod will obviously keep the soil very loose for a year or two by mechanical division, as well as by the slow fermentation of this matter in the soil. But this is not all. The soil is deeply broken up before planting ; it is harrowed thoroughly as soon as the corn comes up, and then there is a rapid succession of ploughing, until the ground is shaded by the corn, and ploughing is no longer possible or necessary. No doubt the plough is preferable to the hand-hoe or cultivator in the case of Mr. Young, for it makes the soil loose to a greater depth ; and we have already explained that, according to his method, the roots of the corn are not exposed to injury from the plough.

From the Cultivator.

Professor Vanuxem's method.

Mr. Tucker : Of all the crops which are raised in the middle States of the Union, none are of so much importance to the farmer as the corn plant, not only for its valuable grain, but its leaves, husks, and stalks, for fodder and manure—no plant which he cultivates being so well adapted to hold the valuable parts of the fæces and urine of the barn-yard, from the pithy structure of its interior.

Corn, for success, requires a loose and rich soil, by which a rapid growth is obtained, and is thus enabled to overcome the changes incident to spring, and its two ordinary and most powerful enemies, the wire-worm and the grub. The ravages of the former are, as we all know, below the surface, and appear to be proportioned to the hardiness and probable poverty of the soil, preying on the main root, effectually preventing all production of the grain, if not destroying the plant. The grub, on the contrary, cuts off the stem near the surface ; its range of destruction more general as regards soil, but evidently feeding from preference upon the more feeble plants ; and therefore, by complying with the conditions requisite for a vigorous growth, its action is but feeble. So, also, when corn is planted upon a sod, recently turned under, the grub finding still its accustomed food.

There is also another observation which I wish to have recorded ; being important to prove, if true, or to set aside, if false. It is the belief that the tendency of the corn plant is to produce a greater yield of grain in northern climates, and less grain and more leaf and stalk in southern ones—no State in the Union producing such prodigious crops per acre as New York, for example. Should this be the fact, it will lead the farmers here, and further south, not to force the plant after it has escaped its early enemies, but to reserve its strength and that of the soil to near the time of setting—merely giving a healthy growth by moderate, and not excessive cultivation, previous to that important state of its being.

For the first years of my farming, the manure was spread in the spring upon a sod for corn, finishing in time to plough for planting. This

plan was changed, hauling out and spreading it the preceding autumn, ploughing as before. This latter method appeared to be preferable, giving not only a quicker growth to the young plants, but evidently a better stand. I also noticed that the effect of the manure from remaining upon the surface for so long a period, comparatively, was to make the soil loose or mellow, and to render the wire-worm and grub no longer causes of uneasiness.

The good effects of covering the ground in the autumn for the corn crop were fully confirmed on an adjoining farm; and the knowledge thus obtained led to the plan which at present I pursue. My neighbor commenced by hauling out the manure which was left after preparing his wheat ground, which sufficed for only about one-third of it. He then proceeded to cover the remainder with straw, but did not finish more than one-half of the part which was left; leaving, therefore, a third part uncovered. The whole was ploughed in the spring in time for planting. It may be satisfactory to state that the field was perfectly level, and the soil of uniform quality throughout its extent, but thin.

From the time the corn appeared above the surface to its perfecting, a marked difference was manifest between the two parts which had been covered and the part left uncovered, having examined the corn at the beginning of the growth of the corn, and at its completion. The parts which had been covered with manure and straw stood well, being unaffected by worms. The color was very good, and produced a fair crop; nor could any difference be perceived between them (as the owner informed me) in the quantity or quality of the grain when husked, so far as the eye could determine.

On the part which had been left without manure or straw, the wire-worm was so destructive as to require more than once replanting. The color indicated less vigor, and the yield in grain inferior in every respect.

No experiment could be more decisive or important as regards the corn-plant than the one related. It established two important facts; the great advantage of covering the ground in the fall of the year for corn; the other, that no difference could be perceived in the crop between the part covered with straw and the part with manure; consequently, that straw could be substituted for manure in its culture.

It has been an object of no small importance with me, in farming, to attain to certainty, quantity, and goodness of crops, with the least expense of labor, and to obtain from the farm all the food or manure required for the various crops to be grown. That the latter object was possible I did not doubt; but in no way could I accomplish it so long as manure was required for both corn and wheat. Had grazing been combined with tillage, there would have been a sufficiency for both these crops; but the farm being wholly arable, there was only enough for one of them.

From being engaged in another pursuit which occupied me some years, and other causes diverting my attention from farming, it is only within eighteen months that I have been able to make an application of straw. My experience, therefore, is too limited to satisfy those who require comparative statistics, but sufficiently so to induce me to believe that I shall attain my object.

The field which was planted with corn last year was a timothy sod, of about three years old. It was covered with straw the preceding fall. The grass at the time of breaking it up, which was just before planting,

looked better than it had at any preceding spring—better than I have known old sods when manured. The corn crop equalled my expectations of it.

The same autumn I also covered four acres of mixed grasses for pasture, leaving about half an acre uncovered by the side of it, which had been in potatoes and highly manured. The grass next year upon the covered part was the best, and better withstood the various spells of dry weather which prevailed last year.

LARDNER VANUXEM.

Bristol, Pa., *January* 6, 1846.

From the Farmers' Cabinet.

GREAT CROP OF CORN.

We, the undersigned, two of the committee appointed by the Chester and Delaware County Agricultural Society on crops, do report: That we have this day viewed the cornfield of Paschall Morris, Allerton farm, near Westchester; that we have calculated the field to contain over ten acres, and that the average yield on the whole field is *a hundred and one bushels and three pecks to the acre.* The corn was planted in hills, $4\frac{1}{2}$ by four feet apart, each way; four grains generally in a hill. The corn was cut up and put into shocks containing six hills each way. Several of these shocks were taken down from different parts of the field, being an average in size, as far as we were able to perceive, and upon being husked, yielded nearly three bushels and a peck of ears each. An average one was shelled in our presence, and yielded one bushel and a half and a pint of shelled corn.

Each shock having occupied 648 square feet of ground; which, being divided into the number of square feet in an acre, will give the number of shocks in an acre: this multiplied by the amount in each shock, will give the result as above stated.

A portion of this field yielded seven half bushels of ears to the shock, which will give an amount of over one hundred and ten bushels to the acre. The committee will further take occasion to observe, that the whole field was remarkably clean and free from weeds, and the soil appeared to be in a mellow and friable condition.

There being no other crop brought to the notice of the committee, it becomes their duty to award to Paschall Morris the premium offered by the society, to which they consider he is fairly entitled.

JOHN WORTH, Jr.
JAMES PAINTER.

11*th month* 3, 1845.

The society requiring, in case of an award of premium for crops, the details of culture, &c., it may be stated that the field was an old green grass sod, not having been ploughed for probably twenty years. Seven years ago it was limed on the surface at the rate of fifty bushels to the acre; since which it has been regularly pastured. It was broken up last spring, with the Prouty plough, to the average depth of about seven inches, harrowed over with the common harrow, and marked out for planting, as stated in the report. The planting was done between the first and

fifth of the fifth month, six grains being dropped into each hill, and afterwards thinned out to four.

When the corn was up two or three inches, each hill received a sprinkle of plaster; no other manure was applied. The after culture was done with the common corn harrow, and one going over with the shovel-plough and the hand-hoe, where the weeds in the hill were too near the corn to be reached by the harrow. Much of the merit of this crop, its freedom from weeds, and continued growth and vigor from the start, are attributable to the deep ploughing and use of the Prouty plough. This plough, by its peculiar mode of operation, breaking the texture of the sod at the same time that it lifts it up and throws it over, pulverizes and crumbles to a certain extent the furrow slice, and by opening it into seams or cracks, admits a passage for the sun and air to the particles of soil, meliorating them, and preparing for the reception of the crop; and when the harrow is afterwards used, the whole is reduced to a finely pulverized state, highly favorable to the action of the atmosphere, and the absorption of its gases, and affording no harbor for weeds, in the shape of hard and impenetrable clods of earth, not uncommon after the use of many other ploughs.

This field, when the ploughing was finished, owing to the open and pulverized appearance of the sod, and the interstices between the furrows being all filled up, allowing no grass or weeds to be seen, resembled one already harrowed, and continued mellow through the season.

PASCHALL MORRIS.

N. Y. Farmers' Club.

The regular topic of discussion was announced—the cultivation of corn—and Dr. Field was called on. He stated that he had made close observations during the four or five years of his farming experience, and had become satisfied that the old system of cultivating corn was decidedly erroneous, although he would not deny that farmers were in the habit of producing very good crops in old times. During his first year he had followed the old system, and he did not obtain so much corn from ten acres as he now got from two. The old way was to begin by ploughing, then to hoe, then plough and hoe again; and this sometimes done three times instead of twice. This, he was fully convinced, was a most injurious practice. In the first place, ploughing disturbed the manure buried with the turf which had been turned over, and permitted the volatile and nourishing gases, the essence as it were of the manure, to escape; and the process of hilling brought the roots too much exposed to the sun, and permitted too much moisture to gather round their extremities. In the next, ploughing cut off a great many of the little roots, which were all important in the process of nutrition. His plan was to first prepare the ground *well*, manure it plentifully, plant the corn in hills about three feet apart and six or eight seeds in each, not forgetting to manure the seed in each hill very powerfully. When it had fairly come up he put in his cultivator—an excellent affair of his own invention—then hoed again; pulled out all but three or four stalks in each hill, and again applied the cultivator—sometimes a third time. He always cut his corn close to the ground.

Dr. Underhill agreed that the cultivator was much better than the plough: too much ploughing and hilling was very injurious. There was no danger of manuring corn too much. He stated that common bog-swamp could be turned into excellent corn land by first draining, cutting down the bogs, and then applying a light coat of four or five inches of sand—silex being a necessary constituent in the production of corn; especially in the stalk, enabling it to stand. From swamp land thus prepared, he had gathered 85 bushels of corn to the acre. As to cutting up corn at the roots, that had long been decided. Judge Buel had discovered, several years ago, that seven or eight per cent. was gained in the grain by this; while the stalks were worth three times the money—six or seven tons of excellent fodder being produced from every acre.—*New York Tribune, June* 16.

From the Albany Cultivator.

INDIAN CORN—NEW VARIETY—PLANTING.

I send you a few ears of a new variety of sweet corn, obtained by the process detailed below:

1*st year*. I had a very early yellow corn, but quite diminutive in its growth—the stalks not over three feet in height, and the ears not over four inches in length. Late in the season I planted this in a patch of sweet or shrivelled corn, then considerably grown. As soon as the tops or blossoms of the yellow corn protruded, they were cut off, in order that the early corn might be impregnated only by the sweet corn. The result this year was yellow corn, of the usual size and appearance.

2*d year*. The last year's product was planted by itself, at a distance from all other corn. The result was, a corn growing about five feet in height, having ears seven to eight inches in length, with a mixture of yellow and white smooth corn and sweet or shrivelled corn on the same cob—fit to eat about the middle of July.

3*d year*. I separated the corn into two parts, the smooth by itself, and the shrivelled by itself, and planted them apart, at a distance from other corn. The product this year corresponded mostly with the corn planted, only there was a slight mixture of the shrivelled upon the smooth corn, and of the smooth upon the shrivelled. The smooth was fit to eat about the middle of July, and the shrivelled about a week later.

4*th year*. I again planted the smooth and the shrivelled corn in separate patches. The smooth was fit to eat 18th July, and the shrivelled the 24th. The height of the stalks averaged about five feet. The character of the two kinds seemed now to be permanently established. The smooth corn produced its like, as did the shrivelled. The latter has the disadvantage of being yellow, but is earlier than common sweet corn, and equally palatable. The smooth corn has a mixture of white and yellow on the same cob.

5*th year*. I separated the white and yellow smooth corn, and planted them apart from each other. The result is two distinct varieties of smooth corn—the earliest fit for eating 19th of July. The white partakes very much of the tenderness of sweet corn. Some portion of it was about a week later than the rest, and grew about a foot higher.

6th year. Having separated the earliest of the white corn from the latest, I planted them apart, and thus procured two distinct varieties of white smooth corn—one fit for boiling 18th July, the other about a week later. Upon the ears of the earliest variety of last year's growth, I noticed a few scattering kernels of white sweet corn. These were carefully picked out and planted this year by themselves. The result is *a white sweet corn, fit for boiling 18th of July*, corresponding with the earliest smooth corn in size of stalk and ear.

My object in instituting this experiment having been to obtain a corn suitable in color and early maturity for marketing, I discarded the yellow varieties, closing the experiment in possession—

1st. Of a white, smooth, eight rowed corn, with ears seven to eight inches long, approaching the common sweet corn in flavor, and fit for boiling 18th of July.

2d. Of a similar corn, but somewhat larger in stalk and ear, and a week later.

3d. Of an *eight-rowed sweet corn*, with ears six to seven inches long, and fit for boiling 18th July, (in 1844, 14th.)

The last variety proving to be the precise article that I was in pursuit of, I have for three years past kept for cultivation that alone. It is that which I send you.

A word upon the proper depth of planting Indian corn. A small patch of the early sweet corn above mentioned was planted last spring *three inches* deep. It came up well and grew thriftily till it was three or four inches high, but then came to a stand. It remained without increasing its height perceptibly, a full fortnight, while another patch of the same kind of corn grew rapidly. On examining the roots of the non-growing corn, it was found that a joint had been formed about an inch and a half above the kernel, and that roots had sprouted out from the joint, *leaving all below to perish.* In other words, the plant had abandoned the lower roots at three inches depth, and formed a new set an inch and a half from the surface. While the process of changing the roots was going on, the plant seems to have ceased to grow above the ground. The effect was to retard the maturity of the corn about a fortnight; but I do not know that its size and productiveness were ultimately impaired.

The inference which I make is, that corn, *to be early*, should not be planted more than an inch and a half deep.

NOYES DARLING.

New Haven, Ct., *November* 18, 1844.

From the New England Farmer.

GREAT YIELD OF CORN-FODDER.

We are indebted to Captain Randall for the following detailed account of his extraordinary crop of corn, a paragraph respecting which was copied into our last from one of the city papers:

New Bedford, *September* 30, 1845.

Mr. Breck—*Dear Sir:* You requested me to give you an account of the product of a field of corn sown broadcast, that you saw when at this

place last summer. I should have done it ere this, but absence from home must be my excuse. Colonel A. D. Hatch—that man of all men for news—has given some account of the crop in the Boston papers. I received a letter last evening from a friend, wishing me to give him all the particulars—the amount of the yield, how the ground was prepared, quantity and kind of seed, &c. And, as I have been getting all the facts together, I will give them to you.

I will first state to you the condition of the land when I took possession of it in March, 1842. There were two acres and about thirty-two rods; it was very full of rocks and small stones, and had been cropped by antique farming, until it would not produce provender sufficient in one year to feed a pair of sheep during that space of time; and such was its condition in July, 1844. At that time, I put it out to clear up and wall by contract; and my specifications provided that every stone that a plough would hit, at a depth of ten inches below the surface, should be removed by men following the plough with iron bars, and that the ground should be grubbed up to the walls to that depth. The contractor ploughed the land one foot deep, harrowed it twice with a heavy jointed harrow, picked up and carted off all the stones, and finished his work as per contract, and to my satisfaction, about the middle of April. I then had the land ploughed across the old furrows by a heavy pair of oxen and one horse, followed by two pairs of oxen on a sub-soil plough, that run on an average 16 inches deep, with men following with iron bars, to remove any stones hit by the sub soil plough. After thus ploughing, the ground was well harrowed by a heavy jointed harrow, the teeth of which are $6\frac{1}{2}$ inches long, and the stones all picked up and carted off. Thirty-five tons of manure were then put on to the acre, and uniformly spread. Said manure was the droppings of 20 head of cows and one horse, all well fed, and the manure was deposited in the barn-cellar, where all the liquid manure was received and well commingled by hogs. This manure was turned under about seven inches, and the ground again well harrowed by the harrow alluded to, and the small stones picked up.

Ten bushels of white flat Maryland corn were then sown broadcast on the piece, and once harrowed as above, and stones again picked up. The cultivator was then run over the ground; it was then bushed with a heavy bush-harrow, and finished by rolling with a roller weighing 2,730 lbs.

I find, by a bill of labor, that the work was finished May 15th. One rod square was carefully measured and cut where it was the smallest, and weighed, by a patent balance, 325 lbs. One rod square, where it was of *middling* quality, weighed 390 lbs. One rod square, where it was of *best* quality, weighed 450 lbs.;—giving an average of 388 lbs. to the rod, and $31\frac{300}{2000}$ tons to the acre.

The corn was cut in the morning by a scythe, and one load carted to a field in the afternoon, where it was eaten by the stock. A load was carried to a small lot near the barn in the afternoon of the same day, and the stock were turned in the following morning after the cows were milked, where the fodder was eaten up clean. In this way it was all fed out green, being a little wilted.

The product of two acres and about thirty-two rods fed *twenty cows in milk, or in calf dry*, one heifer over two years old, two stock bulls, grown, and five spring calves, for seven weeks and five days. This was all the green food my stock had for that time, except what they could pick up

from a pasture burned up, in which they had run during the season. In five days after feeding on corn-fodder, my cows increased their milk one can full, or ten quarts. I did not test the quality of the milk by my lactometer; but I presume it was equally as rich as from grass. I am a pretty good *living lactometer*, as I take about three tumblers full of milk, as a substitute for tea, every day, and I pronounce it as rich from corn-fodder as from grass.

I am satisfied, most fully, that the corn-fodder, taken from $2\frac{32}{160}$ acres was equal to 15 tons of the very best of English hay.

Excuse this tax on your patience, and believe me, dear sir, your obedient servant,

GEO. RANDALL.

APPENDIX No. 4.

From the Cultivator.

THE CULTURE OF THE SWEET POTATO.

The sweet potato (*Convolvulus batatas*) was introduced into England previous to the Irish potato, and was in those days supposed to possess the qualities of restoring decayed vigor to the human frame; and consequently more frequently found in the shop of the confectioner, than in the larder of the cook. It is a native both of Spain and the Canary islands, and was, as an edible, in such *bad repute* that the renowned *Evelyn*, in his work on gardening, as early as the year 1699, recommends that potatoes should be planted in the worst ground. We are glad that we live in an age and country where we can say, plant sweet potatoes in your best land; though in all probability, in the days of the author above quoted, the promise of this root was such that it held forth no inducements to the cultivator; and certainly time has shown that England's climate and soil have proved uncongenial to its improvement. There are many, even in our southern country, at this day, who take his advice, and neglect this crop; from the sole fact, perhaps, that they themselves are not fond of potatoes, not consulting the tastes of voracious hogs and cows, who, squealing and lowing for corn and hay, would be happily regaled with a satisfactory meal from the potato pile.

In the south, we regard the successful cultivation of the sweet potato as an easy attainment. It delights in a sandy, rather light, deep, and well-stirred soil, which must be located on a dry sub soil, though in some instances we have seen good potatoes raised on clay lands. A moist atmosphere, the temperature of which is warm, appears most conducive to the early growth and pleasant flavor of the sweet potato.

From its great use in culinary concerns, it deserves more attention at the hands of our southern planters than it has as yet received. The climate south of 36 degrees has been found admirably adapted to its growth; and no crop can be planted which will yield more to the acre. The fine effect which they give when fed to milch cows, should make it a favorite with all who delight in good milk and butter. When dried in a brick oven, they furnish the material for making a delightful and wholesome beverage in the shape of potato beer. The sweet potato also furnishes a large amount of the vegetable food of slaves in the southern States during the winter months; and though they are generally cultivated as a provision crop by most planters on almost every plantation, the negroes cultivate them in the ground which is allotted to them for their own private use. Such is the partiality of the plantation negroes for potatoes as an article of food, that, as soon as the season for digging arrives, they prefer an allowance of this root to any of the cereal grains. Indeed, it seems they were relished by our revolutionary ancestry; for when an embassy was sent, by the British commander at Charleston, to General Marion, in his swamp encampment, that chivalrous commander, with his characteristic hospitality, invited the royalist to dine with him. The table was arranged; when he found "flesh, fish, and fowl" to consist of sweet potatoes alone. He straightway returned to the British

quarters, and expressed his opinion that it was hopeless to expect to conquer men who could fight for *liberty* on *such fare* as *roasted potatoes.* Mr. John B. White, a talented and gifted son of Carolina, has made this scene the subject of a national painting, which stands high in the world of art. In this picture the negro seems delighted more at the style in which his potatoes were roasted, than at the amazed countenance of the tory officer.

To the negro the potato is a blessing; for, to the known improvidence and carelessness of this race it is particularly adapted, as it requires no culinary skill to make it both edible and palatable, simple roasting in the ashes being the best preparation the cook can give them. It is frequently prepared for the table by baking, and makes good custards, puddings, and pies; the latter equalling rhubarb pies, and made much in the same manner.

If the soil has been exhausted by previous culture, the land should be manured. My father, Mr. John Summer, who has always been successful in the culture of potatoes, observes the rule to manure broadcast; and for this purpose, has prepared in the farm-yard a compost, made by hauling in oak leaves, which, with the admixture of the manure of horses and cattle, furnishes the proper material; and this, when sufficiently rotted, is spread broadcast over the surface of the soil. The general plan, however, in the south, and that which is considered easiest, is to *cow-pen* the ground intended for potatoes, late in the summer. When the latter plan is followed, it should be continued during the early part of the winter, and followed with frequent ploughings, so that the manure deposited may not evaporate, or be washed away by rains. Plough up the land very deep in January, to which we would recommend a sub-soiling to those who have the proper implement. Plough again in February, and in March repeat with a like ploughing; immediately after which bed up the land, with a suitable plough, four feet wide: upon these beds drop the potato slips, six or seven inches apart, covering them with a hoe, one and a half inch deep, with good mellow soil.

It should be remembered that the proper preparation of the soil is of very great importance to the future crop. This mode of planting in beds is usually termed ridging; and simply to cross the beds into equal squares with their width, we can form potato hills by drawing up the corners of the squares with a hoe. We have tried both hills and ridges, and have no preference; though the soil, when planted in hills, is most likely to be washed away by heavy rains. From three to four slips should be planted in the hill. As soon as the slips begin to sprout, the ridges or hills should be scraped off with the hoe, which will enable the young plants to come up readily; and immediately after they have appeared above ground, the beds should be ploughed down carefully, and the ploughing to be performed as close to the plants as they will bear, so as not to disturb the parent slip. This will yield to the young plants that warmth which is so much desired in this culture, and potatoes thus cultivated will stand the summer droughts better than those which have been cultivated otherwise. Frequent ploughings, with a few times hoeing, is all that is necessary, until the vines attain a length which interferes with the ploughing, at which period the ridges and hills should be drawn up with the hoe, fuller than they were originally, and in such a manner that they should be hollow at top. Great care should be taken not to draw any soil on the vines; and therefore, whilst drawing up the beds they should be gently raised by the hands. Just before the vines reach the bottom of the beds, a plough should be run twice through the rows,

in order to give them mellow earth to root in. This will serve to sustain the vines in extreme drought; and as the leaves are almost the only organs which feed tuberous roots, I would earnestly recommend an abandonment of the practice of topping potatoes, or of tearing the vines with a plough, and particularly the practice of making a calf pasture of the potato patch late in summer.

Potatoes for planting should always be raised from cuttings, as they are generally more succulent, and vegetate better in the spring than those which are raised from small potatoes; and hence large potatoes, bringing stouter plants, are preferable to very small slips.

The product per acre may be variously estimated. From two to three hundred bushels are commonly produced. My father has raised upwards of five hundred bushels of good potatoes to the acre, and from two to three hundred bushels has been an average crop with him. They were of the dark mottled variety usually called the Spanish potato, which, for a general crop, we consider best, though any and every sort should be cultivated which are regarded of good quality; and, as there are perhaps more than twenty approved varieties, we are not advocates of any particular one. The yams suit a sandy location, whilst the dark Spanish would succeed better on clay soils. There are several varieties with a red skin, which are much esteemed by some. The variety known as the "Bermuda" are perhaps the best early variety, and for this reason a portion of the crop should be planted of them, or some other favorite early variety. There appears to be only two distinct varieties of the yam, the yellow and white. Both should be cultivated by putting the slips in a bed, and drawing the sprouts as they appear above the ground, and planting them in ridges. In this way, but a comparatively small number of slips are required of this variety. For all other varieties of the sweet potato, we would advise to plant the root itself. The yam is easier preserved during winter, and late in spring is of better flavor than any of the other varieties.

My friend, Colonel R. F. W. Allston, of Georgetown, during the past season, tried an experiment, which, as it is new, and upon the whole has succeeded admirably, I will notice here. The land was laid off in beds four feet apart, and upon these the seed were planted, by laying them on the level ground eight inches apart, and covered over with "tailings," (the straw, &c., blown off in winnowing rice,) to the depth of a foot. In consequence of the severe drought of the past spring, the stand proved a very bad one; the sprouts appearing at the distance of one, two, and three feet apart. The prospect, he says, for a crop, was very meagre until the month of July, when the plants which were standing grew off with a vigor quite remarkable. In consequence of the drought a little earth was drawn upon the beds once, and the grass which showed itself was once picked off. The potatoes were taken up the second week in November, and they yielded 283 bushels of excellent roots to the acre, several of which were exhibited at the anniversary meeting of the State Agricultural Society, weighing from four to six pounds. They were yams.

Our plan for preserving potatoes is simple. A circular bed is formed 8 or 10 feet in diameter; this is raised a foot above the surrounding surface to insure its being dry; on which we place dry pine, straw, cornstalks, or pine bark; in the centre of this we set upright a plank tube, with a great number of holes bored in the sides; around this tube the potatoes are piled up until the cone is completed within a few inches of the top of the tube,

when they are covered up with cornstalks, pine, straw, &c., and lastly with earth five or six inches thick. The tube may be closed in frosty weather by a wisp of straw. During mild weather it should be opened in order to allow the heated air arising from decayed or bruised potatoes to escape. With this, and the addition of a temporary shelter, we have always succeeded in saving potatoes during the winter.

We unhesitatingly recommend that the same land be planted in potatoes each succeeding year, believing that the culture of this crop adapts the soil for the increased reproduction of the root, and that the covering of the vines, when potatoes are gathered, restores to the soil a larger supply of nutrition than is consumed by the production of the crop.

WM. SUMMER.

Pomaria, S. C., *December* 18, 1844.

The sweet potato.—Our planting friends will find in the following article, which we extract from the "Vicksburg Constitutionalist," much valuable information relative to the above named common and useful vegetable:

"We do not know a more valuable edible plant, root, or vegetable, than the sweet potatoe; its productiveness is really astonishing—wonderful. In soil well adapted to its growth, we have *heard* of 1,500 bushels being housed from one acre; we have *known* over 800 saved to the acre repeatedly; and we have evidence of 1,200 bushels being carefully measured from one acre of a field of ten, to decide a bet, many years since. There is no difficulty in keeping them *now* nearly all the year; there is no difficulty or extra labor in the cultivation. Plants are easily saved and kept, and one bushel is quite enough to plant an acre.

"The best soil for sweet potatoes is rich, loose, and *new:* stiff clay does not suit them. *Deep ploughing* is just as necessary as it is for every other agricultural production. Let the beds be made just four feet from the centre of the furrows between; throw the earth up with a heavy plough as high as possible, and then the *hoe* labor will be light; make the ridges eighteen inches high, and do not make them before your plants are nearly ready to set, otherwise they may become soddy or hardened. The plants are often placed immediately in the ridges; this plan may do very well when you have seed in abundance to plant and replant; but we think it best to *bed* the plantings in rich mellow soil, elevated so as to keep the water off, and narrow enough to draw sprouts without trampling them. When they put forth a leaf or two they are ready to place in the ridges, which must be done in rainy or moist weather; and the earlier after there is no danger of frost, the better. In this State the plantings may be bedded in the latter part of February, or any time in March, and the ridges prepared as soon as the sprouts begin to appear handsomely. They must be kept clean to secure a good crop; carefully weeded, and the grass and weeds kept from the whole field. After the vines begin to run, then draw the soil well upon the ridges again; first ploughing carefully between. Sweet potatoes sell readily in all cities, towns, and villages. There is no better food for man or beast. The best of the various descriptions is called, in Mississippi, *yam;* in North Carolina it is well known as the pumpkin Spanish. The medicinal quality is valuable and important. When properly baked,

they are very sweet. Children are very fond of them, and they are a sovereign remedy for the 'summer complaint.' Horses, cattle, sheep, and hogs eat them greedily and fatten upon them. Negroes are always *happy* when they have a plenty of '*sweet taters*'—and negro children never want any thing else. With the least attention properly given, 400 bushels to the acre can be produced; value them at forty cents, (less than they ever have been sold for,) and you have $160 for one acre, which in cotton is not worth over $20. Sweet potatoes cannot be raised north; and our steamboats can find markets up the Ohio, Mississippi, and Missouri, for tens of thousands of bushels."

VESTAL'S METHOD OF CULTIVATING SWEET POTATOES.

Directions for sprouting sweet potatoes.—First: In a bed of earth, make a box by setting boards or planks edgewise on the ground, and put in of good stable manure about a foot in depth, over which spread good rich earth to the depth of two inches; upon this lay the potatoes so near as almost to touch each other, and cover them from two to two and a half inches deep with good loose earth. If the nights are cold, this bed must be carefully and seasonably covered with straw, or some other warm covering, to keep the potatoes from chilling or freezing. Uncover the bed the next morning, or as soon as the weather is warm enough. If at any time the bed become too dry, water it in the evening with branch or rain water; but if well or spring water is used, it should have stood in the sun during the day preceding. The manure put in the box should be horse manure, fresh from the stable, and should not be more than half rotten; for if wholly rotten it will contain no heat, and of course will not warm the bed. There is danger of making the bed too warm, and thereby spoiling the potatoes. To find if the bed be too warm, put your hand into it some distance below the surface. If you find it to be too warm, cool it by watering it. If the manure be kept very wet, it will not heat; nor will it heat if very dry. It ought to be kept moderately moist, in order that the heat may be regular, and of the proper temperature. It may be kept tolerably wet after the plants begin to come up, if the weather is warm. When the plant is three inches high, it will do to set in the ridge or hill.

Directions for planting and raising sweet potatoes.—Put two plants in a hill; set them two or three inches apart, and make the top of the hill sufficiently hollow to hold about a pint of water. Set the plant a little deeper in the hill than it was in the hot bed. Do not wait for rain in order to plant. If the weather be dry, plant them in the evening, and put about a pint of water to each hill; if spring or well water is used, it should have stood in the sun the day preceding, as before remarked. It is better to plant in a dry time and water them, than when the ground is too wet; for when the weather becomes dry, the ground will bake and retard the growth of the plant. The ground should be prepared when it is dry, and the planting done when there is a prospect of rain; but if it should not rain, the plant should be watered. The plants may be planted in ridges; and when they are thus planted, place them from eight to ten inches apart. When planted in hills, put two sprouts in a common sized hill—one is better than three; if the hill is small, one is better than two. When the

patch is large enough, they should be ploughed, for they do the best when thus cultivated. I plough mine each way once, and sometimes oftener. At the first ploughing, I scrape the weeds and grass from the hills and draw a little loose dirt round the plants; draw up but little dirt the first time you work them, for the hills will warm through better when small. When ploughed the last time, hill them up; do this the last of July or first of August. If the vines have grown across the furrows, turn them to the opposite side of the hill; hoe the side thus left bare; then turn them back and hoe the other side; never wind the vines upon the top of the hill—it will prevent the sun from warming it as much as requisite to the full growth of the potato. The vines should not be cut off; if they grow very rank, I pull them loose from the ground and drop them down again; this is to prevent the little sprouts from growing and incumbering the hill with a brood of small stringy potatoes. I prefer this mode to cutting them off. The potatoes are not hurt by a light frost or two; they should be dug as soon as the frost kills the vines, as the growth of the potato will then cease. If dug before much rain they will not be injured.

If any person is desirous of further information respecting the proper culture of the sweet potato, if they will call on me at my residence, I will show them my potato ground, and give all further information. I am aware that the opinion prevails to a very considerable extent that the sweet potato can only be cultivated to advantage in the southern States; but I am satisfied, from thorough observation and experience, that this opinion is erroneous. Any quality of soil that will produce good corn will produce good sweet potatoes; and they will mature in any climate that the common yellow or flint corn will. If the weather will permit, I usually commence planting about the first of May, and I have raised good potatoes from a planting the last of June. The mode of sprouting the potato in a warm bed possesses many advantages over that of planting them in the hill. If the potato is planted in the hill before the earth becomes warmed by the sun, they will rot; and at best, it will take some three or four times the length of time for them to sprout in the hill that it would in the warm bed, and the plant can be ready to transplant from the warm bed to the hill as early as it would do to plant the potato, by which some three or four weeks' (at least) saving of time will be had in the early part of the season, which is a desideratum that is all-important in a climate where the season is short; and furthermore, by this means a peck of seed may be made to plant at least ten times as much ground as it would if originally planted in the hill. Some persons, when they take the plant from the warm bed, cut off a portion of the potato with the plant. This I am satisfied is an improper mode, as the portion of the potato set in the hill with the plant is liable to sprout, thereby producing in the same hill too many plants and of different growths; in consequence of which, a great many small and stringy potatoes are produced, and none of the potatoes will be so large and fine as if the plant alone is set in the hill. The best mode to remove the plants from the warm bed, when they become large enough, is to take the plant between the thumb and finger, close to the ground, pressing on the ground with the other hand so as to prevent the potato from being moved in its bed; then pull the plant directly up: by this means the bed will continue to produce plants for five or six weeks.

It has been contended that sweet potatoes will only grow in sandy ground, but I have proved this opinion to be fallacious. Ground that is

clayey, and even hard, will produce good crops of them, but it should be manured. The best way to manure the ground, after it has been ploughed, and if cloddy harrowed, is to furrow it off as you would to plant corn; then take and put a good shovelful of horse manure in the furrows where they cross, then make your hill over it; it keeps the ground loose and warm, and greatly promotes the growth of the potato. Good crops of potatoes may be raised for a succession of years off of the same piece of ground.

I intend to keep on hand a large quantity of seed, with which I can supply orders from almost any section of the Union. Persons living at any great distance had better procure seed and sprout them at home; but from the last of April to the last of June, I expect to keep on hand, at my residence in Cambridge city, Wayne county, Indiana, a supply of sprouts, or plants, sufficient to supply all demands. They can be sent a hundred miles or more, and grow well. Persons sending for plants should send a box or basket; a half-bushel basket will hold a thousand or more.

In order that the public may be enabled to form some idea as it regards the quantity of potatoes that may be raised on a given piece of ground, I have taken some trouble to have some of my neighbors, to whom I had sold plants, to measure their crops and the ground they grew on. The following certificates will show the result. Before presenting which, however, I would state that I measured the crop of my own raising the present year, and the ground it grew on, and the result showed a yield of *three hundred and ninety-seven bushels* per acre.

Certificates.

Cambridge City, *December* 18, 1844.

This is to certify, that the present year I raised a crop of sweet potatoes from seed procured from Aaron H. Vestal, of this place, which I ascertained, by measuring the ground and crop, to be a yield of *four hundred and eighty bushels* per acre. I raised a crop on the same piece of ground last year, from plants which I procured from Mr. Vestal, that surpassed, both in quantity and in the size of the potato, the present crop. I have raised the sweet potato in the Middle district, in Kentucky, and have seen their crops in both North and South Carolina, but have never raised or seen better potatoes than those above stated.

BENJAMIN BERRY.

Cambridge City, *December* 18, 1844.

This is to certify, that the present year I raised a crop of sweet potatoes, on quite a rough piece of ground, from plants obtained from Aaron H. Vestal, of Cambridge city, which produced a yield of *three hundred and fifteen bushels* to the acre.

JOHN WERKING.

Cambridge City, *December* 18, 1844.

This is to certify, that I raised a crop of sweet potatoes the present year from plants that I obtained from Aaron H. Vestal, of this place. I did not measure the crop, but I should judge that the yield was not short of *three hundred and fifty bushels* per acre. I have seen the best crops of potatoes

that are raised in Maryland, but I have never seen finer ones than those I raised this year. I ate potatoes last April that were kept over winter by Mr. Vestal, that tasted as fresh and sweet as when dug from the hill. I purchased a right from him for keeping potatoes through the winter, and have put up my crop as it directs. So far my potatoes have kept well, and I have no hesitation in saying that Mr. Vestal's mode of cultivating and keeping the sweet potatoe is the best I have ever seen, and one that will prove of great value to community.

WILLIAM CONWELL.

CHARLOTTESVILLE, *Hancock Co., January* 1, 1845.

This is to certify, that I raised sweet potatoes from sprouts procured from A. H. Vestal, of Cambridge city, Indiana, and after measuring the ground and the yield of potatoes, find that the yield was at the rate of *two hundred and ninety bushels per acre.* I also have purchased from him a right to keep sweet potatoes through the winter; and on this day the potatoes are as fresh and as good as when first dug from the ground. I have upwards of one hundred bushels that I am keeping over, and am well pleased with the manner in which they are kept.

HENRY LEHMAN.

From the Indiana Farmer and Gardener.

POTATO CROP.

The potato crop has never been as much attended to in this region as in New York and New England. We believe, however, that its value is becoming apparent, and that potatoes will be produced to a much greater extent than hitherto. Reserving some remarks of our own to a future number, we insert the methods of cultivation employed by eminent cultivators.

Spurrier's method of cultivation.—"Be careful," says he, "to procure some good sets; that is, to pick a quantity of the best kind of potatoes perfectly sound and of a tolerable large size; these are to be prepared for planting by cutting each root into two, three, and more pieces, minding particularly that each piece be furnished with at least one or two eyes, which is sufficient. Being thus prepared, they are to be planted in rows not less than eighteen inches distance; if they are to be ploughed between, they must not be less than three feet, and if four feet apart the more eligible."

"The best method I have found by experience is to make a trench either with the spade or plough, about five inches deep, and putting long dung or straw at the bottom, and laying the sets on it at their proper distances, which is from nine to twelve inches apart, covering them with mould. They must be kept clean from weeds."

Mr. Knight's plan.—"He recommends the planting of whole potatoes, and those only which are of fine medium size—none to be of less weight than four ounces. The early sorts, and, indeed, all which seldom attain a greater height than two feet, are to be planted about four or five inches apart in the rows, centre from centre, the crown ends upwards, the rows to be from two feet six inches to three feet asunder. The late potatoes, which produce a haulm above three feet in height, are to be planted five or six

inches apart, centre from centre, in rows four or five feet asunder. The potatoes to point north and south, and to be well manured."

Makenzie's plan.—" Work the ground until it is completely reduced and free from root weeds. Three ploughings, with frequent harrowings and rollings, are necessary in both cases, before the land is in a suitable condition. When this is accomplished, form the drills; place the manure in the drills, plant above it, reverse the drills for covering it and the seed, then harrow the drills in length.

" It is not advantageous to cut the seed into small slips; for the strength of the stem at the outset depends in direct proportion to the vigor and power of the seed plant. The seed plant, therefore, ought to be large—rarely smaller than the fourth part of the potato; and if the seed is of small size, one-half of the potato may be profitably used. At all events, rather err in giving over-large seed than in making it too small; because, by the first error, no great loss can ever be sustained; whereas, by the other, a feeble and late crop may be the consequence. When the seed is properly cut, it requires from ten to twelve hundred weight of potatoes, from twelve and a half to fifteen bushels, where the rows are at twenty-seven inches distance; but this generally depends greatly upon the size of the potatoes used. If they are large, a greater weight may be required; but the extra quantity will be abundantly repaid by the superiority of the crop, which large seed usually produces. Plant early in May."

Barnum's plan.—" Plough deep and pulverize well by thoroughly harrowing; manure with compost, decomposed vegetables, or barn-yard manure; the latter is preferable. When coarse or raw manure is used, it must be spread and ploughed in immediately. Stiff clay soil should always be ploughed the fall previous. Lay your land in drills twenty-seven inches apart, with a small plough, calculated for turning a deep narrow furrow, running north and south; lay on the bottom of the drills two inches of well rotted barn-yard manure, or its equivalent, then drop your potatoes, if of the common size, or what is more important, that they retain the usual quantity of eyes; if more, they should be cut to prevent too many stalks shooting up together; put a single potato in the drills or trenches ten inches apart; the first should remain uncovered until the second one is deposited, to place them diagonally in the drills, which will afford more space between the potatoes one way than if laid at right angles in the rows. The covering may be performed with a hoe, first hauling in the furrow raised on each side the drill; then carefully take from the centre of the space the soil to finish the covering to the depth of three and a half or four inches. By taking the earth from the centre of the space on either side to the width of three inches, it will leave a drain of six inches in the centre of the space, and a hill of fourteen inches in width gently descending from the drill to the drain; the width and depth of the drill will be sufficient to protect the plant against any injurious effects of a scorching sun or drenching rain. The drains in the centre will at all times be found sufficient to pass off the surplus water.

" When the plant makes its appearance above the surface, the following mixture may be used: for each acre take one bushel of plaster and two bushels good ashes, and sow it broadcast as even as possible. A moist day is preferable for this operation; for want of it, a still evening will do.

" The operation of hilling should be performed *once*, and *once only*, during the season; if repeated after the potato is formed, it will cause young

shoots to spring up, which retards the growth of the potato and diminishes its size. If weeds spring up at any time, they should be kept down by the hand or hoe, which can be done without disturbing the growth of the stalk.

"My manner of *hoeing* or *hilling* is not to haul in the earth from the space between the hills or rows, but to bring on fresh earth sufficient to raise the hill around the plant one and a half or two inches; in a wet season, the lesser quantity will be sufficient; in a dry one, the larger will not be found too much. The substance for this purpose may consist of the scrapings of ditches or filthy streets, or the earth from a barn-yard that requires levelling. Where convenient, it may be taken from swamps, marshes, or the beds and banks of rivers or small sluggish streams at low water. If planted on a clay soil, fresh loam taken at any depth from the surface, even if it partakes largely of fine sand, will be found an excellent top-dressing. If planted on a loamy soil, the earth taken from clay pits, clay, or slaty soil, will answer a valuable purpose; in fact there are but few farms in the country but what may be furnished with some suitable substance for top-dressing, if sought for. The hoeing and hilling may be performed with facility by the aid of a horse and cart, the horse travelling in the centre of a space between the drills, the cart-wheels occupying the two adjoining ones, thereby avoiding any disturbance or injury to the growing plants."

Mr. Barnum's method attracted great attention at the east, from the fact that he actually raised from one thousand to fifteen hundred bushels of potatoes to the acre! When this was first published, it was received with great incredulity; calls were made for the method of cultivation, which drew forth an elaborate article from Mr. B., of which the above is but a morsel. It afterwards was stated, and the most authentic and unquestionable evidence adduced in proof, that Mr. Barnum raised, upon experiment, *at the rate* of more than three thousand bushels to the acre. Now although the labor and the great amount of seed required would prevent the cultivation of many acres of land thus, yet it is worth a trial in a small way; and if one acre can be made to produce one thousand bushels, it will be as much as is usually dug from *five* acres; and it is questionable whether the labor and seed for five acres are not more than that required by Mr. B.'s method for one. [Ed. Ind. Farmer and Gardener.

Mr. A. Robinson's plan.—He says: "If I plant low ground, I plough my ground in beds in a different direction for the water to drain off, then harrow lengthwise of the furrows and small lands. Having a number of them, side and side, I take a light sharp horse-harrow, and harrow crosswise of the beds, which pulverizes the ground and fits it well for planting, leaving a small space between the rows, which answers for two purposes, one for a guide for the rows for dropping: this is done by dropping in the middle of the tracks of the harrow, which is easily and correctly performed by any small boy. It also serves completely to fill up all cracks or holes, the seed lying fair and easy. I then drop my manure directly over the seed potatoes, and when covered up, the seed is safe from inundation, by being some inches above the surrounding surface; the seed lies warm under this manure; the rains drain into the middle furrows. I plant three feet distance. It takes the most of the surface that is pulverized to cover the potatoes; and by the time they are twice well hoed, my hills are as I want them to be. They naturally rise high above the surface in the form of a sugar-loaf; this hill is to turn off heavy rains, and it naturally keeps the potatoes from being too moist, and they are often injured thereby. I

have found that three feet each way is the most proper distance to insure a good crop. I plant three common sized potatoes in the hill; it is no use to cut them; if cut small, the vines come up small and weak, grow fast, and fall down."

The following method we take from an able writer in the Louisville Journal, signing himself GRAZIER:

"The ground selected for potatoes should be dry, where no surface water will rest. It should be rich; if not naturally so, it must be made so by a sufficient quantity of good manure. It should be ploughed twice, and at least twelve inches deep. After the first ploughing, it should be harrowed and *cross* harrowed; and, after the second ploughing, harrowed again; and if not very friable and free from clods, it should then be rolled. The mould cannot be too fine, as on the depth of the ploughing and fineness of the earth depend the *retention of that moisture* so indispensable to the health and maturing of all bulbous roots in particular. The ground thus prepared should then be opened off in *drills*, three feet from the centre of one to the centre of the other, and, if practicable, running north and south. When opened, if manure is to be applied, it must then be hauled in carts. The horse going down between the drills, the bed of the cart will cover two drills, where the manure can be pulled out at intervals, in quantity sufficient not only for the two drills described, but for one on each side in addition; all of which one hand, following with a fork, can easily distribute and spread in the four drills.

"This done, the ground is ready for the seed. I shall first describe the whole of the cultivation and harvesting necessary, and then speak of the seed and its preparation separately. The seed should be dropped in the manure, twelve inches apart; and as quickly as a drill is planted, the plough should follow and cover it in. The double mould-board plough, which is the proper implement for the business, will cover two drills by going once up and once down the field; if the single mould board plough is used, it will of course cover but one drill by the same operation. When your ground is thus gone over, your land will all be in high drills, and can rest so for about one week, when you must take a two-horse harrow, and harrow your drills *across*, leaving your field as level as before your drills were opened. There is no danger, as some would suppose, of disturbing your seed. In a few days, when you can see your plants distinctly above ground, from one end of your drills to the other, you must take your one-horse plough, and go up and down each drill, running the land side of your plough as close to the plant on each side as you safely can, throwing the earth away from it, which operation will leave your field in raised drills between your plants. In a few days after this, you take your double mould-board plough, and go down the centre of the blank drills, covering all your plants nearly out of sight, observing as you go along that the weight of earth is thrown against and not on the plants. Then, in some days after, when your plants are well over the top of your drills, take your scuffle—an implement not unlike your cultivatior in this country, and for which the cultivator can be substituted—and go over your whole field between the drills, giving the earth a good stirring, and not be afraid of encroaching a little at each side on the drill. At this stage, a boy should follow the scuffle, and pull up any weeds that appear on the top or sides of the drills. In a few days after this, when your plants are strong and well up, you go down the centre between the drills, with your double mould-board plough,

the wings well apart, and throw the earth well up to the plants. This must sometimes finish the cultivation, if the vines have spread and are closed too much, but generally the vines will allow it, and the crop be much benefited by one more scuffling; but this time take particular care not to disturb the drill at the bottom, as the bulbs are now forming and spreading; then gently run your double mould-board plough through the whole field again, narrowing the wings of it, which will have the effect of adding the earth, and compressing it to the bottom of the drill, where the bulbs are forming, rather than throwing it up to the stalk at top, where there is sufficient already. This finishes the cultivation.

"To prepare the seed, you must select well shaped, even potatoes, not too small nor too large. Cut them, leaving one good eye at least to every set; prepare them from two to three weeks, at least, before you plant; and each day as you cut, roll your sets in pulverized lime, and spread them on the barn floor to dry; when dry, heap them in a corner till taken out to plant. If this plan is pursued, and the ground selected and prepared as directed, you may rest satisfied that so sure as the laws of nature are invariable, and that like effects follow like causes, as sure will a good and sound crop of potatoes be produced in this climate, with no variation in the result except what may be occasioned by the vicissitudes of the season.

"Ten tons of potatoes, two thousand two hundred and forty pounds to the ton, is considered a fair crop in Ireland. Twelve tons an extra one—equal to three hundred and seventy bushels the first, and four hundred and forty-four bushels the second; allowing sixty pounds to the bushel, which I have found to be about the average weight of a bushel here. I have grown four crops of potatoes in this country, in two different situations and latitudes, (six acres the smallest quantity cultivated any season.) Each crop was treated in every particular as here described, and in three instances out of the four I got a little over four hundred measured bushels to the acre. The fourth crop was only about three hundred and fifty bushels to the acre, caused by the peculiarity of the season, which produced an almost entire failure with my neighbors, under their management."

From the Cultivator of October, 1845.

CULTURE OF THE POTATO IN SCOTLAND.

To the Editor of the Albany Cultivator:

I shall now detail to you the most approved practice in regard to the cultivation of the different crops, and shall devote this letter to that of potatoes, which may be regarded as the commencement of the rotation in the district in which it is reared.

The land, which the previous season had been under oats, is ploughed before the winter frosts set in, with a furrow varying in depth from eight to nine or ten inches. In giving the first furrow for any of the fallow crops, it is considered good practice to cleave down the ridges, taking care, however, to preserve the original furrows, if the land is not thoroughly drained. The advantages of this plan are, the levelling of the field, thus rendering

the subsequent cross ploughing more perfect and more easily accomplished. It also affords greater facilities for the escape of sudden and severe falls of rain on undrained or retentive soils, and more perfectly exposes all parts of the soil to the action of the frost during winter. The land having been ploughed in the manner already described, and that when it is not too much saturated with moisture, the furrows at the headlands and the water courses are cleaned out, so as to prevent any water from lodging.

When the drying winds of March have fairly set in, and the land is relieved of that excess of moisture which usually prevails through the winter, the field is harrowed so as to pulverize the surface, and is then ploughed in a direction across the ridges. This furrow is generally eleven or twelve inches in depth, or as deep as the plough will work. It is then harrowed with four or five turns, and rolled if found necessary; after which, it again receives a double turn of the harrows, and the root weeds which have been brought to the surface, and freed of adhering soil by the different operations, are carefully collected into heaps by bands of women and boys, and removed from the field. Should these various operations not have rendered the soil clean, or of sufficiently fine tilth, it is either grubbed with Finlayson's harrow, or again ploughed, harrowed, and rolled, and the weeds collected as before. If the land has been allowed to become foul, or is of a very stiff nature, it is sometimes ploughed a third time, so as to render the soil very fine and absolutely free from weeds. I have found it an excellent plan, in cleaning foul land, to give it (prior to the spring ploughing) a turn of the Finlayson harrow to the depth of four inches, then to harrow, roll, and collect the weeds brought up. The advantage of this is, that a considerable portion of the weeds are removed before they are mixed through the large quantity of soil stirred by the deep spring furrow; and that portion, too, which being then laid undermost by the plough, is most difficult to be got rid of afterwards. In preparing clay land for green crops, I have tried the following plan with success: As soon as possible in autumn, I plough and otherwise work the land, then open the drills, and allow it to remain in this state till the time of planting. The plough is then passed along the drills, for the purpose of removing any soil which may have fallen from the sides of the ridgelets by the action of the frost; the manure and seed are then deposited, and the ridgelets split by the double-mould plough. A fine "crumb" is thus placed over the manure and seed, excluding the air and drought, and affording a suitable nidus for the young plants; and this in a soil which any amount of labor, by the ordinary method in dry seasons, would hardly reduce finer than a mass of clods the size of road metal. The saving of spring labor effected by this plan is also an important item in its favor.

But to return from these digressions. The field having been properly worked, in the way which I have endeavored to explain, two ploughs, each drawn by two horses, proceed to open the drills, which are usually twenty-seven inches wide. The manure, which has been turned about eight days previously, and allowed to attain a slight degree of fermentation, is then carted out and deposited in heaps, commonly in every fifth drill. A person follows the cart, dividing the heaps equally among them, while five spreaders, with small forks or "grapes," distribute the manure regularly along the drill. These are followed by an equal number of planters with the seed, which they drop seven inches apart. After the ploughs have opened fifteen drills, they return and cover two of those first

opened, in which the manure and seed have been deposited; they then open two in going, and cover two in returning, and so on; thus there are never more than fifteen drills open at once. By the method detailed, the seed and manure are but a very short time exposed to the sun and air, while I am satisfied that there is no plan more economical of labor; for if there are a proper number of men at the dung-hill, not an instant of the time of any individual in the field is lost. Thus, if the dung-hills are conveniently placed, two ploughs, three carts, three men filling manure, one boy driving, and one man dragging out the heaps, in addition to the field workers already mentioned, will finish, in the best style, three Scots acres per day, supposing such were to receive forty tons of manure, about the average quantity allowed. The planting of each field is concluded by working and planting the headlands, cleaning the hedge-roots or bottoms of walls, and planting, by the spade, the corners, as well as all other places not accessible to the ploughs. The beginning of May is as late as it is considered prudent to plant.

The potatoes used for sets or seed, as they are termed, are for the most part brought from some of the high, cold districts, where the land has been lately reclaimed from a state of nature. Those from moss are most esteemed. Peebleshire and the upper ward of Lanarkshire furnish a large portion of those used in Midlothian. As the price generally exceeds the ordinary market rates, while the Lothian farmers themselves do the half of the cartage, the raising of potatoes for seed has of late years added very much to the resources of the farmers in these bleak moorland districts.

Few subjects have attracted more attention in the agricultural world than the cause of the failure of the potato crop, but it still seems hid in impenetrable mystery. It is now a well ascertained fact, that potatoes grown in the potato districts of the Lothians will not reproduce themselves in a healthy manner. I observe in a late number of the "American Agriculturist" what I have heard also stated in this country, that the application of manure in the drill tends to increase the destructive effects of rot. This I must take leave to doubt, as on the only farms in this parish, which have *entirely* escaped this scourge, the manure is never applied in any other manner. It is of the utmost consequence that the seed should not be kept in large heaps, neither before nor after cutting, as fermentation is easily induced, and I am aware has often taken place when little suspected. The quantity of seed used for an acre is four-fifths of a ton.

Soon after planting, the drills are rolled with a light roller; and when the stems are within a short distance of the surface, they are saddle-harrowed. By this means the annual weeds which may have germinated are destroyed, and before another braird can make its appearance the crop is ready for the hoe. Whenever the rows can be distinctly traced, a drill grubber is passed down between them, being adjusted, by means of its screw, to go as close to the young plants as is consistent with their safety. They are then immediately hand-hoed, and in the course of ten days they are again horse and hand-hoed, and slightly moulded with the double mould plough. The growth is now very rapid, and just before the stems from the contiguous drills begin to meet, the grubber is again passed between the rows—this time narrowly set, and drawn by two horses, so as to loosen the soil to as great a depth as possible. They are now finally earthed up; and if the crop is good, the stems soon begin to interlace, and in a week or two present an unbroken surface of leaves and bloom.

Early in October, the crop is raised either with the fork or plough, and stored partly in houses and partly in long conical heaps on the surface of the ground, which are slightly covered with straw, and then with earth to the depth of six or eight inches. The earth for this purpose is obtained by digging a trench along the sides of the heap, thus forming a drain which prevents any water from lodging in the interior. These heaps or "pits," as they are termed, are generally from five to five and a half feet in width, and four feet in height, and are occasionally of great length, containing sometimes 6,000 bushels.

The yield of this crop varies from eight to fourteen tons, but there have been instances of eighteen and twenty tons per Scots acre of marketable potatoes being raised.

In the district around Edinburg, the potato crop is of the first importance. This will be readily understood, when I mention that *here* four contiguous farms have always 200 or 220 acres under it; and as the manure, when brought to the field, does not cost less than 7*s.* per ton, it will be seen that if to this we add rent, seed, and labor, a sum little short of £1,200 is involved in the growth of fifty acres, exclusive altogether of any profit. The price which has been obtained for these two years past was 45*s.* per ton, but some years it has reached 60*s.* and 80*s.* The moderate price of late years has been in a great measure owing to the low price of oatmeal, and a considerable importation from Ireland.

The use of portable manures is gaining ground greatly as an auxiliary to the ordinary manure. Guano on any soil at the rate of three or four cwt. per acre, and rape dust on strong soils, at the rate of six or eight cwt., sown on the drills above the dung, are found to yield a very remunerating profit. Mixtures, containing the elements of the stem and tubers, have also been applied with great success, and as chemistry advances they will no doubt be much more commonly used. As our scientific knowledge becomes more perfect, and more diffused, those unsuccessful attempts at the application of principles to practice will be more rare; and when they do occur, instead of throwing discredit on science, and producing doubt and hesitation, they will be referred to the true cause—the errors or want of knowledge of the operator.

I am, &c. JNO. GIRDWOOD.

FEATHERHALL, MIDLOTHIAN, *August*, 1845.

CULTURE OF POTATOES.

WASHINGTON, D. C., *December* 3, 1845.

DEAR SIR: As requested, and to aid you in your very laudable and praiseworthy undertaking, in disseminating over the country intelligence and improvements in agriculture, I give you my experience and observations on the subject of the round or Irish potato, being fully satisfied that for many years the demand for them would increase, and their importance for the use of man be more fully demonstrated; under such impressions, I turned my attention to the culture and best manner of preserving them for family use and for transplanting.

1st. I have formed a clay soil, well manured from the cow pen or horse-stable, in October or November, and ploughed in immediately from four to eight inches deep, (a cow pen or horse-lot, ploughed in the spring, where

cows, hogs, and horses have been penned during the season, and again ploughed in the fall, and lay over to be mellowed by the frost, is better;) to lay over until spring, then prepared, at the season for planting, in drills three feet apart. Have a compost prepared of leached ashes, burnt earth, chaff, or short straw, and scatter in the drill, on which drop your potato. Small or middle-sized potatoes should not be cut, and large potatoes not more than once, (making two pieces,) commencing to cut at the stem end, and cutting them lengthwise. The potato should not be covered deep; and in dressing them, no additional earth should be drawn about the stalk after it is above the ground. They should be kept clear of weeds or grass by hand-weeding, if necessary.

If your potato field be properly prepared before planting, but little labor is required for their cultivation—the less the better.

So soon as your potatoes are ripe, (which may be known by the dying of the vines or stalks,) have them taken up in dry weather, and put into boxes or barrels, in dry sand, which must be clear of any vegetable matter or earthy substance. Have your boxes or barrels then placed in some cool place, that is dry and airy, until winter or very cold weather; then remove them to a dry cellar, or other place, not too warm. Thus stored, they will keep a year without sprouting; when taken out for use, they will be found full, mealy, and the flavor much improved—retaining all their original fullness.

When planted, after being preserved in this way, they give nourishment to the young plant, and aid greatly in bringing forth good healthy new potatoes. Great care should be taken, when harvesting the potatoes, to select none but the best and ripest for seed and family use—the small and unripe should be selected for the use of the stock.

The round potatoes are better and more profitable in high latitudes, and north of the thirty-sixth degree of north latitude in North America; south of that they degenerate after the first year. Seed taken from the north to the south does well for early potatoes the first season, but will not do for transplanting.

It is important that the growers of the potato, who desire a continuance of healthy, sound potatoes, should look to their potato vines or stalks, and when the balls are fully ripe on the stalks, (which will be known by the stalks dying,) gather them, wash the seed in clear water, and place them to dry, secure from insects; when dry, put them in a dry place until spring. Have prepared a bed in the garden, and put the seed in drills eighteen inches apart; cover them with earth well pulverized, not deep. Keep the weeds and grass from about the young stalks. They will show the time for gathering by the dying of the vine; then take them up and place them in clean sand until the next spring; then plant them in good soil with compost, as directed in the first part of this communication. When you take them up, you will discover perhaps a dozen varieties and colors. You should now assort them, and put each kind to itself, in sand. They do not come to perfection for use until the third year. Plant each kind by itself, not together, the third year, as directed, and you will discover, when you take them up, the potatoes that will be most productive, and useful for family purposes; which may be preserved for use and planting. Those less productive may be tried on other soils, and prove good. This done, and pursuing the directions herewith, your potatoes will continue perfect many years. You will hear of no failures of crops, or diseased potatoes. Laziness and want of at-

tention to the proper culture of this invaluable vegetable are the causes of failure.

I never had a failure of crop; always plenty, and good, for myself and neighbors. Nothing but adversity and a scourge on man will make him show his energies: it is necessary, or the great Author of all good would not send it upon us.

Your friend,

JNO. A. ROGERS.

Hon. EDMUND BURKE,
Commissioner of Patents, Washington, D. C.

From the New England Farmer.

CULTURE OF POTATOES.

S. Widney, of Piqua, Ohio, successfully cultivates potatoes on the following plan: Plant in hills, and when the potatoes are about an inch out of the ground, take a light plough and run it so close to them as to cover them lightly with earth. When they get through this an inch or so, cross plough them, covering up as before. This mode is stated to be equal to the best hoeing, besides being a great saving of labor. Mr. W. states that he has practised this mode for several years, and has never lost a hill or had them at all injured by covering.

From the New England Farmer.

CULTIVATION OF POTATOES.

Mr. BRECK—*Dear Sir:* I observed in the last number of the Farmer an account of the plan by which Mr. Widney, of Ohio, successfully cultivated his potatoes. It augurs well when even one person has the fortitude to step beyond the barriers of any ancient system, which may have nothing to recommend it but its antiquity; and it must be no small degree of pleasure to such person if his plan proves successful; for besides the pecuniary advantage to himself, it saves him from the ridicule of the friends of "the good old way," and they are neither few nor far between.

In reading Mr. W.'s account, a thought suggested itself to my mind to give you an account of a plan which I have practised with success; but I am not the patentee, nor do I know to whom the honor of originating it belongs. All I know is, that it was the common mode of cultivating potatoes in Scotland twenty years ago, and I did not learn that it was *new* at that time.

The plan is as follows: After the ground is properly prepared for planting, furrows or trenches, or whatever you please to call them, are opened with the plough, into which the manure is put, and the potatoes planted either whole or cut. If cut, they may be planted from 4 to 10 or 12 inches apart in the furrow; if whole, from 12 to 18 inches apart. The distance should vary according to the fertility of the soil and the quantity and quality of the manure used, and also according to the kind of potato and the purposes for which they are intended to be raised. The distance between

the furrows or drills (as they are called) should not be less than 30 inches. After the potatoes are planted, they are covered with the plough, and in a dry season it is a good plan to roll the drills, in order to prevent the moisture from escaping; but in a wet season rolling should be omitted. By compressing the earth about the seed it vegetates quicker, a thing of the utmost importance in the present diseased state of the potato plant. If any doubts are entertained of the vegetative powers of the seed, it should be planted when the land is in a moist state. In very dry weather the morning and the evening is the best time; or if a damp day occurs, it should be taken advantage of for that purpose, and in all cases the seed should be covered immediately after planting; for a potato with weak powers of vegetation, when planted under such circumstances, and on well fermented manure, will grow well, when the same potato, if planted in dry weather, and on unfermented manure, and exposed for some time to the influence of a hot sun, would rot before it would vegetate. And that is perhaps one reason why one portion of seed grows well, while another portion, in every respect the same, does not vegetate at all, or comes up so weak that the plants are entirely useless for producing a crop. (Exposing potatoes to the sun for a few weeks in the fall has a good effect in producing quick and powerful vegetation in spring. I have tried the experiment with perfect success.) When the potato plants are about an inch above ground, the plough is run along the drills or ridges, and the plants are covered in the way that Mr. Widney speaks of; and the deeper they are covered the better. After this operation is performed, a light harrow is passed over them; but care should be taken to keep it moving lightly, by having the two ends of a rope fastened to the hind bar of the harrow, the ends of the rope being far enough to enable the person who attends it (he having the bend of the rope in his hand) to lift the harrow all off the ground at once, when it meets with any obstruction or becomes filled with weeds or any other material. I prefer a harrow so light, and the teeth so fine, as will allow of its being passed over them two or three times, as that will leave the ground in a more pulverized state, and the weeds (if any) will be better shaken and more exposed to the sun than if a heavy harrow had passed over only once. It should never be allowed to drag, but should be kept playing lightly on the surface of the drills or ridges; and, by using double reins on the horse, one person can easily manage both the horse and the harrow. The best kind of harrow for the purpose is one with curved bars, (after the form of the felloe of a cart-wheel,) with the teeth longer where they enter the side of the drill, near the bottom, than those which enter it on the top. After this operation has been properly performed, the ground is left in a fine pulverized state, and as clear of weeds as when the potatoes were planted.

When potatoes are early planted, and weeds begin to show themselves at an earlier period than that mentioned above, the operation should be performed twice; but if it requires to be performed only once, I should defer it until the plants are above ground, as by so doing the weeds are destroyed, and before they can start again the potato tops will cover the ground, and the weeds will therefore only have a sickly growth.

After the plants are three or four inches high, a small plough (a light sub-soil plough answers best) should be run as near as possible to the plants, and the earth thrown from them. If a sub-soil plough, or any plough without a mould, is used, (which are the kinds best adapted for the purpose; for if the plough has a mould it cannot be let in deep, as it would throw the

earth on the opposite row,) it should be let in as deep as possible, both on account of the present and after crops. If the ground has been suffering by drought about the time the potatoes are in this stage of their growth, I should prefer having them lying in the state last described just at the time the rain fell, as the moisture would get immediately to their roots; and if the earth is laid up to the plants in a damp state, it will retain the moisture about the roots for a considerable time, especially as the tops will shade the ground, and to a certain extent prevent evaporation.

After the earth has been thrown away from the plant, the cultivator should be run in the space between the rows, to level the ground and to shake and expose the weeds. After this operation has been performed, the plough should be run along the centre of the space between the rows of plants, and the finely pulverized earth laid up to them; but care should be taken to keep the drill or ridge flat and wide on the top, for the purpose of receiving the moisture of dews and rains. When the potatoes are further advanced, the plough may be run through the same tract as before. It may not be necessary to lay up any earth this time, but only to renew the surface of that which has been previously laid up, in order that any weeds which were making their appearance might be destroyed, and also that, by breaking the crust, which had become hard on the surface, evaporation and absorption will go on more freely; and it may even be necessary to run the plough through a third time, for the above reasons.

The above system is as applicable to the cultivation of potatoes planted in hills as to those planted in drills, rows, or ridges, or whatever you may please to call them. The plough can be run at right angles in the spaces between the hills, as practised by Mr. Widney.

The plan I have described is not so simple and easily comprehended or practised as that of Mr. W., and is therefore not so likely to be adopted; but those who have fortitude enough to leave the ancient land of *hoe-field* and travel as far as Mr. W.'s system, and find it successful, may perhaps screw up courage enough to proceed a few steps further into the depths and mysteries of cultivation, and perhaps find out a plan far surpassing any that has yet been discovered.

By practising such a system of cultivating potatoes, the ground is stirred deeper and is better pulverized, and lies looser about the plant, and also kept cleaner and left in a superior state of cultivation for future crops than it could have been under the hoe system of culture, however well performed. And if the plan is properly executed, the hoe will not be required, except where the land, by previous mismanagement, has been well seeded down to weeds; and even in that case it will only be necessary to use it between the plants in the hills or drills.

I have seen and heard of a great many methods for raising (or *digging*, as the term is here) potatoes, but the best which I know of is to run a double mould-board plough through the centre of the drill or hills, after the tops have been thrown aside, and have one or two prongs, like harrow-teeth, attached behind the moulds, to harrow the furrow which the moulds throw out. By this operation, and by harrowing the ground afterwards, the potatoes can be taken tolerably clean out. Another plan is to run the cultivator between the drills or hills, and take part of the earth away on each side, and then take out the middle portion with a pronged hoe. The latter plan will probably take the potatoes out cleanest. But such implements can only be successfully used on land that has been kept clear of

weeds, or has had the long ones pulled before the commencement of the operation; for the plough or cultivator would be choked in such fields as are not unfrequently met with, in which weeds are so prominent objects that it would be difficult for a stranger to determine whether any thing else than weeds is to be found.

Respectfully, yours,

ALEX'R BICKETT.

Lowell, *December* 1, 1845.

From the Cultivator.

CULTURE OF POTATOES.

L. Tucker, esq.—In the last number of the Cultivator, you expressed a wish that I should give a particular account of the process of culture by which I have succeeded in raising the unusually large crops of potatoes which I mentioned to you in a former communication. There is nothing in my plan either difficult or original, and I am only surprised that greater crops are not generally raised; knowing as I do, from experience, that to produce 800 bushels per acre is, in this vicinity, an easy and simple process; provided the season is moderately favorable. For potatoes I prefer a soil composed of sand and clay in about equal proportions, resting upon a clay sub-soil. On such a piece of land, which has been in grass a few years, I haul out in February or March six four-horse wagon loads of good stable manure to the acre, (about 80 bushels to the load.) The manure is immediately spread and turned under by inverting the sod to the depth of ten inches at least. About the last of April spread on the inverted sod about three additional wagon loads of manure to the acre. Harrow the ground well lengthwise with the furrow. Cross plough to the depth of four or five inches, and harrow again. By this time the last manure applied is well mixed with the soil, and the land is in a fine state of tilth. The first of May, mark out the ground in rows three feet apart each way, with a large two-horse plough, to run as deep as the first ploughing. A good plan is also to let the bull-tongue plough follow in the furrows after the bar-share plough. This breaks up and loosens the sub-soil under the rows. A sub-soil plough would, I suppose, do the work better, but we have none, and the bull-tongue answers very well, as it loosens the sub-soil and does not throw it up. We plant the "*long reds*," using large potatoes for seed, cut into pieces with about four eyes each, and put four pieces in a hill; which takes about twenty bushels of seed to the acre. The seed is thus planted deep, on a loose mellow bed, and the ground, after the planting is completed, has a perfectly level appearance. The after culture is quite easy and simple. As soon as the plants are two inches above the ground, plough with the bull-tongue as near to the hills as possible; if most of the plants are covered up, so much the better. In two or three weeks plough again both ways; by this cross ploughing the earth is well loosened and thrown up around the hills, in a sort of hollow square, a little depressed in the centre, presenting a broad surface to receive the rains, and convey the moisture to the roots of the plants. The hoe is used to destroy such weeds as have escaped the plough, and to give the hills the proper form. Care is taken not to make those conical shaped hills which used to be the fashion, so admi-

rably calculated to carry off all moisture from the roots of the plants. I have found the *long red* to be the most productive of any kind of potatoes I have ever cultivated. I tried the Rohans two years, but found them to yield at least 30 per cent. less than the long reds. I have never tried planting in drills, and prefer hills on account of cross ploughing, which I consider very important. I know that 800 bushels per acre can be raised by my plan, for I have done it three years in succession, in 1842, '43, and '44. In the year 1844, the rot made its appearance in my potatoes, and I supposed that about 200 bushels were destroyed. Last spring, in addition to the other manure, I applied about 40 bushels of wood ashes and 4 bushels of refuse salt per acre to my potato ground. The ashes were spread with the last application of manure, and the salt sown broadcast after planting the seed. I think that the ashes and salt had some tendency to prevent the disease, as it was less destructive to my crop than it had been in 1844, while the crops of many of my neighbors suffered much more than in any previous year.

Respectfully, yours, &c. WM. McCOY.

FRANKLIN, *Pendleton Co., Va., January* 10, 1846.

From the Albany Cultivator.

THE POTATO ROT.

Mr. EDITOR: In almost every number of your Cultivator I find something in relation to the rot in the potato, both as regards the cause and the mode of prevention.

This, with us, is a disease of comparatively rare occurrence; and may, I think, be justly attributed to our peculiar method of cultivation; and, indeed, so far as I can understand, where this plan has been adopted no case of the disease has ever made its appearance.

In the selection of our land we prefer a light sandy soil, without *great* regard to *the richness* of quality; this having been well pulverized, is drilled to the depth of from five to six inches, and from one and a half to two feet apart. At the bottom of these furrows, and at the distance of eight inches, are laid the potatoes, which we prefer being cut with from two to three eyes to a piece; the drills are then filled nearly to the top with the best well littered stable manure; a small portion of dirt is thrown on this, so as to level the whole. The entire surface of the ground is then covered with leaves, (*we* prefer *pine* straw,) to the depth of from three to six inches.

It is to the adoption of this last method I particularly allude. The advantages of the straw are obvious; by its use is produced a more uniform moisture, as well as temperature of soil, which is kept perfectly free from grass and weeds, although no further attention is required either from the plough or hoe, until the maturity of the potatoes; which, for their size and number, I have never seen surpassed or equalled by any other method. This plan, with us, although not universal, is becoming much more general, and will, I think, in a short time supersede that of any other.

THOMAS C. HINES.

NANSEMOND, *Va., July* 12, 1845.

From the Southern Planter.

NEW MODE OF PLANTING IRISH POTATOES.

We would call the attention of our readers particularly to the following communication. Dr. Camm, the author, is represented to us as a gentleman of great observation and of the highest respectability. In the course of a hurried conversation, he informed us that the pieces of potato were to be put three or four inches apart in the hot-bed, and that the plants, or shoots, were to be separated by insinuating the finger and thumb as deep as necessary into the earth and plucking them off as close as possible to the old potato, exactly as has been heretofore recommended for the sweet potato. These plants are more hardy and certain of living than either sweet potato, cabbage, or tomato plants. There was another circumstance that the Doctor mentioned to us, which is not recorded in the communication; it was this—that the *rot* made its appearance amongst those potatoes that grew from the sets, whilst those raised from the plants were entirely free from any marks of this disease.

"*Mr. C. T. Botts:* Since the great improvement in the culture of the sweet potato, by forcing and setting the plants, I have been disappointed in finding no account in our agricultural journals, on the like treatment of the Irish potato. Having tested it for three years, I the last season cultivated them altogether in this way, and had six crops to succeed well, all of which were drawn from the same bed.

On the 30th of March, 1844, I had a piece of ground prepared in the usual way, and furrowed with a seed plough at six feet distances. Twelve and a half furrows were planted with a bushel of Mercer potatoes, two eyes to a set, and eight inches a part in the row. On the same day, I had half a bushel of the same kind cut across the middle, and the larger, or stem ends, put on one side, and the smaller, or seed ends, put on the other side of the same hot-bed. The pieces were placed so as not to touch, and covered with three inches of garden mould.

"April 27th, harrowed the land, gave the planted potatoes the first working, and had enough furrows made between the planted rows to set three and a half rows of plants drawn from the small ends of the potatoes, and one and a half from the large ends.

"May 22d, set one and a half rows from small ends, and two and a half rows from large ends.

"June 4th, set one and a half rows drawn about equally from each side of the bed.

"June 22d, set one row, and some few were set afterwards; so that nearly all the ground between the planted potatoes was filled up. The planted potatoes, owing partly to the drought, came up so badly that but for the experiment I should not have cultivated them; and I had peas planted where they were missing, to make the advantage in ground-room about equal with those from the bed, which were set at the same distance in the row, and gave me the finest stand I ever saw.

"On the 26th of July, the planted potatoes, as well as those first set, were in condition to be dug. Of the planted potatoes, twenty-four hills, taken together, and putting in all sizes, filled a peck, weighing fifteen pounds. Of the small ends sixteen hills, and of the large ends eighteen hills, filled the same measure, weighing sixteen pounds each. Of the peck of planted potatoes, the small refuse potatoes were considerable, and about

twice the quantity contained in those from the small or seed ends; whereas, among those set from the large ends were none of consequence. The largest raised from the small ends weighed eleven ounces, (larger than any from the planted,) and the largest from the stem ends weighed one pound and three-quarters, full weight—larger by eleven ounces than any I could hear of in my neighborhood.

"I have been thus particular in the above detail, that you may judge of the legitimacy of the following, among other inferences:

"1st. Half the quantity of seed will answer for the same ground—a saving of six to eight bushels (Bridgeman) per acre.

"2dly. Less than half the labor of cultivating will be sufficient, as the planted potatoes required two, while those set required but one working, and it is easier to work plants of some size than those that are smaller.

"3dly. Of those that *stood*, the quantity harvested were nearly twice as great from those set as from those that were planted.

"4thly. There was no perceivable difference in the time of maturing of plants drawn from different ends of the potatoes and set at the same time, although you will observe that the number of plants first thrown up were more than two to one in favor of the seed ends; and in the second crop, this ratio is nearly reversed in favor of the stem ends.

"5thly. A considerable difference in size of the set over the planted potatoes, and a more marked difference, in this respect, of the larger over the smaller ends of the potatoes, which confirms the general impression in this particular.

"6thly. This experiment shows an increase in size and quality, which we might very rationally expect, from having each plant separate, and those of the same age planted in the same ground and at the same time.

"Such as may be skeptical can readily test this method by setting the missing hills of their next crop from those that have more than one plant. As the Irish potato crop now engrosses considerable attention, I hope the foregoing may not be without interest to your readers.

"Your obedient servant,

"EDWARD CAMM.

"YORK COUNTY, *January*, 1846."

From the American Agriculturist.

CULTURE OF POTATOES.

The December number of the Agriculturist contained a short article upon the potato rot, and an invitation to its readers to contribute facts relating to the *cultivation* of the potato.

My farm is upon the banks of the Connecticut, and the soil is of alluvial formation. Such soils are not favorable to the production of potatoes, as they are too close, and harden from the influence of the sun after rain. The porous, moist, upland, is congenial to the potato. Upon our *intervals*, [meadows or bottoms skirting the river] we prepare the potato ground precisely as we do for corn, by spreading upon the green sward coarse and unrotted manure from the barn-yard, and turn under as early as we can. After rolling and harrowing we plant upon the surface, in hills about three

feet apart in the rows, and make the hill as large as we can. We do not hoe more than once, except in wet seasons, when the weeds flourish.

I planted one piece in the usual manner as early as the middle of April, and on the last day of May I planted another piece upon the same swell of land, turning under a good coat of grass, to the depth of five inches. I then sharpened a stake, (not very sharp,) which was about three inches in diameter, and put an inch pin through it about ten inches from the bottom, so that by stepping upon the pin I could easily perforate the sod. I then began making my holes between the two first furrows, about 18 inches apart, and continued to do so in every fourth lap through the field. I then put one medium sized potato in each hole, forcing it down to the bottom of the sod, and covering it with my heel. After planting the whole field in this manner, I went over it with the roller, which left the surface perfectly smooth. After the tops were three or four inches high I plastered them, and covered the plaster an inch or two with my hoe. Before the tops got to be too large I went between the rows with a cultivator, and pulled the weeds out between the hills. The result of the experiment was very gratifying. The crop from this piece was almost twice as large as from the other. The potatoes were larger, and much finer for the table, and cost me not more than half the usual labor. I would observe that this experiment was made upon dry soil, and in a very dry season. The process of decomposition underneath the sod concentrated the moisture, and the unbroken surface prevented evaporation. When I harvested (which I think should be as late as possible, and avoid the freezing) I found that the tops came from below the sod, but the potatoes were upon the surface, some of them out of the ground. I shall try this mode again, and place the potatoes twelve inches apart in the rows.

I have escaped the rot, although all my neighbors have suffered from it the two past years. I cannot account for it; but, reasoning from analogy, I have formed the following opinion: that is, the disease is caused by an insect. The plant may be too mature, or not sufficiently so, when the insect appears, to suffer from such attack; therefore we succeed best when we plant *early* or *late.* This same theory would apply equally well to the supposition that the disease is the effect of the damp, hot weather of August.

In sowing wheat in the spring we know that we escape both the weevil and rust, either by late or early sowing; and I have noticed that the blast in the potato and the rust in the wheat come together.

WM. BELLOWS.

WALPOLE, N. H., *January* 13, 1846.

From the Boston Cultivator.

POTATO CULTURE.

I noticed a method of treating potatoes which struck me as very good, especially on old ground. First, furrow the field both ways, and then plant in the check or cross of the two furrows; cover them lightly, yet deep enough to have them vegetate quick. As soon as the sprouts begin to crack the ground, go into the field, and from the cart put a fork or shovelful of coarse or green manure on top of the hill; then plough between, turning the furrows together, and cover the manure. Always follow with a hoe, and see that the manure is well covered. As the rows

run both ways, when time to hoe, plough contrary from the first time, and very little labor is required to hill sufficiently and keep the weeds down. The manure is as safe in this manner as heaped up in the yard or field to wait the fall crop. It is not exposed to the sun, nor is it as likely to heat and throw off the ammonia and other properties essential to vegetation, as it would be in larger quantities or heaps. In digging the potatoes and ploughing again for the grain crop, the manure is completely mixed with the earth. I go heart and hand for putting all manure into the earth as soon as it can be got from the farm, whether coarse or fine, especially in the spring of the year, instead of heaping it up to rot and waste through the summer.

Mr. Demarest says he gets nearly double the quantity of potatoes from this method, to what he would without this manure. Coarse manure helps to keep the earth moist under it. I have seen potatoes vegetate and produce well, lying only covered with straw about six inches, and no earth over them. E.

Passaic County, N. J.

From the London Gardeners' Chronicle.

PULLING OFF POTATO FLOWERS.

We observe that a letter has been addressed to the editor of the *Hereford Times*, by Mr. W. Godsall, strongly recommending all persons interested in the potato crop to pull off the flowers diligently as they appear. We beg to second that wish. All experience shows that flowers of the potato are produced at the expense of that organizable matter which gives its value to the tuber, and which is diminished in quantity in proportion to the number of flowers that have been fed; for flowers must exist and feed on something, and that something is what would, if not removed by the flowers, descend beneath the ground and collect itself in tubers.

The mere production of flowers is a loss; but the mischief is infinitely increased if the flowers are succeeded, as they almost always are, by the berries. The actual amount of loss produced by each truss of flowers is not ascertained; but it is probable that if the flowers extract one ounce of organizable matter, the berries consume at least twice as much. Now, as potatoes are not grown for the sake of either the flowers or the berries, every particle of matter which is consumed by the plant in producing them is a dead loss to the grower.

The man who makes his potato ground feed flowers, prevents it feeding his children. Every ounce of matter consumed by the flowers is so much taken from the consumption of the family.

We cannot just now lay our hands on any precise evidence of how much is lost in this way. Mr. Godsall assumes it to amount to many hundred weight, or even a ton an acre; but he is in all probability under the mark.

A bunch of potato berries weighs, we will say, half a pound. Suppose that each potato plant bears half a dozen bunches; that makes three pounds of worthless produce. An acre of potato ground carries about 20,000 plants on an average; this gives 60,000 pounds of waste. But of this 54,324 pounds will be water, according to Mr. Edward Solly's experiments, and only 5,322 pounds organic matter. The latter, however, or two tons seven hundred weight fifty eight pounds, would, according to this calculation, be the amount of loss sustained per acre by allowing the potatoes to flower and fruit.

Admitting, however, that this is an excessive statement; supposing it to be wrong by even one-half—and it cannot hardly be so much as that—still there is the most ample evidence to show the immense importance of preventing the potato expending its energy in the wasteful production of parts which are of no sort of use for food.

[The above suggestions coming (as we presume they do) from the pen of Prof. Lindley, the celebrated botanist, are entitled to great consideration.]—*N. E. Farmer.*

From the Boston Cultivator.

ON REMOVING POTATO BLOSSOMS.

We have seen accounts of several experiments in removing potato blossoms, in which it appears that by this process the crops were considerably increased; and this seems reasonable in theory, as some kinds of potatoes produce a crop of balls equal to one-fifth the crop of potatoes, as we have learned by experiment; yet all experiments do not give uniform results. Some cultivators say that they find, from their experience, that the crop is no larger for removing the blossoms; others say that it is less.

A writer in the Ayrshire Agriculturist (Scotland) states that he made a small experiment; and according to the result, he had one ton less to the acre on that part where the blossoms were removed. His experiment was on the cup potato, which flowers, but produces no apples or seed. It is stated in the Hereford Journal, (England,) that a farmer in west Lothian pulled the blossoms from one row of his potatoes, 23 yards long, and that row produced 13½ lbs. more than any of the adjacent rows, on which the bloom was left.

We wish for our correspondents to make exact experiments this season, on this subject, and let us have the result. Better remove the buds before the blossom forms. Make the experiment by removing the buds from alternate rows, and weigh the produce.

As the qualities of the potato ball or apple differ considerably from the root or tuber, it may be that the juices destined to nourish the balls will not, on removing the blossoms, go to increase the roots. This view is not unreasonable. But it seems strange to us that the removal of the buds or blossoms will reduce the crop. And we think that there is some mistake as to this. We should think it more likely that in one case of the kind the experimenter made a mistake in weighing or measuring, than that nature played so singular a part; yet the ways of nature in some respects seem mysterious, and this is only because they are imperfectly understood. We are astonished at the lighting of a candle by the application of a piece of ice, or the production of ice in a red-hot crucible; but this is as much in accordance to nature's laws as ignition from a friction match, which, by the way, was at one time a wonder.

From the Gardeners' Chronicle and Agricultural Gazette, Sept. 13, 1845.

CULTURE OF POTATOES.

A great deal has been published respecting the culture of the potato; but as I have seen nothing which agrees either with my practice or theory,

I will detail my plan. My own family well know we can buy none equal to those which I grow, and that on a stiff surface soil, over brick clay, at the depth of 12 to 16 inches. In every other kind of propagation we are careful in the selection of the parents—so am I with my potatoes. Instead of planting, as too many do, just those which, in the spring, may happen to be left, my plan is this: When my potatoes are dug in autumn, in picking them off the ground, the best, of a middling size, (or perhaps I might say of a size just larger than the small,) are put aside for next year's planting. It is not necessary to cook potatoes to know the best. They are those which are truest to the proper shape of the sort, with a rough skin, but no canker or other blemish. Much as has been said to the contrary, I am very careful that they should be quite ripe.

The sorts I chiefly use are, ash-leaved for early, golden red or golden dun (both most excellent) for second, and the pine-apple kidney for late. The two former I always plant whole, at 2½ feet apart in the rows, and one foot between the sets. The last I give three feet between the rows. The ground of course cannot be too light and friable before planting; and I always think it better to have been well manured for the previous crop; but if I use any manure for the potatoes, I put it over the sets. These I put in very shallow, (just covered with the earth;) in fact, theoretically, I believe they would be just as well placed on the top of the ground. When they are six or eight inches high, I draw the earth to them from the middle space, which, being tolerably wide, gives them a bank sufficiently wide to grow and mature their tubers in. I never think of having carl, or mildew, or any other evil; nor have I any blight this year. I have to-day (August 29) been digging some ash-leaved, grown under the shade of large apple-trees, but quite sound and good.

CORYLUS.

From the Gardeners' Chronicle and Agricultural Gazette, Dec. 27, 1845.

ON THE PRODUCTIVENESS AND VITALITY OF POTATO SETS.

I send you two papers of mine, which have appeared in the "Irish Farmers' Journal." They are perhaps too much Irish to be of any use in England; yet you may find something in them to serve the holders of allotments. You will find that I allude, in them, to some curious facts, by which it appears that plants are productive rather from the space they obtain over ground than below it; and that, on rich ground, which we might suppose better able to sustain a close crop, if its nourishment proceeds from the root, grain sown at very wide distances gives an acreage return equal to that sown at much narrower intervals. Is it that the ammonia, light, and electricity of the air are not in sufficient quantity for plants at these intervals? The strength and length of the straw would indicate a greater action of light on the carbonic acid. Do plants, instead of absorbing by their roots their particular food, throw off by their leaves the peculiar matters they do not assimilate, and thus plants of different assimilating powers thrive together? And where they do not exist together, may not the soil absorb them, and in part retain?

J. M. GOODIFF, *Granard.*

[The following are the papers, B and C, alluded to by Mr. G.]

B.—ON THE PRODUCTIVENESS OF POTATO SETS.

There is, perhaps, nothing more worthy of inquiry than the differences which exist in the productiveness of plants under the same treatment, in the same soil, and in close contiguity with each other, and without any discernible cause for these differences; and, with a view rather to draw attention to the subject than to the conclusiveness of results, I beg leave to detail an experiment made with potatoes.

It occurred to me that the very great variations of productiveness of potato plants of the same kind of potato, and in the same drills and ridges, and in immediate proximity to each other, were not likely to arise from any peculiar property of the contiguous soil, or any gaseous influence in the air, but rather from either the manner of cutting the sets, their more or less exhausted state from previous growths, or from some internal construction indicated by the form of the potato, or the eye, from which the shoot proceeds. I submit this experiment with some hesitation, as from a mistake in over-manuring the ground it is not so decisive as it might otherwise have been. I had it manured on the surface after the potatoes came up, not recollecting that it had been previously dunged, and the consequence was that the plants grew with almost equal and very great luxuriance. The rows were seven yards long and two feet asunder, and planted on the 30th of May. This late planting allowed the first growing eyes of the potato to have made and lost some previous shoots. I say the first growing eyes, for it must have been observed by others as well as myself, that some eyes of the potato shoot earlier than others, and that some of the late shooting eyes (though generally nearer the stem of the potato) do not shoot at all when a whole potato is planted. I have, by cutting out the eyes of the potato as they successively grew, not only induced every eye to shoot, but have even got a shoot near the stalk, from where there was no perceptible eye till the shoot came forth.

From this property in the potato we may see how wasteful it is to plant it whole, as also the cutting it down in two parts, from the rose buds to the stalk, recommended by some. The first row was of the rose-eyes, (three-top-eyes) scooped out with a teaspoon in the form and about the size of the top of a man's thumb; the second row was of the bottom, or stalk-eye; the third, of the stronger eyes that had previously sprouted and lost their shoots; the fourth, of the later and weaker looking eyes that had not sprouted; the fifth, the scoops taken downwards, so as to take in the protuberance under the eye, and which, I think, may possibly contain sap-channels of the eye; the sixth, scooped upwards, so as to exclude the protuberance; the seventh, those projecting or nipple-eyes, which appear to be the result of a later growth, and are generally an aggregation of small eyes; the eighth, scooped downwards as the fifth row; the ninth, as the sixth; the tenth, as the seventh; the eleventh, deep-eyed potatoes; the twelfth, shallow-eyed, having a disposition to appear as the sixth; the thirteenth and fourteenth, deep-eyed, with a very deep-eyed red potato among them: the plants of this red potato all had the curl, and were unproductive. All the eyes were scooped—the direction of the scoop being towards the stalk in all, except those otherwise stated, as either upwards or more decidedly including the protuberance beneath the eye.

No.	Kind of set.	Produce, in pounds.
1	Top, or rose eyes - - - -	24
2	Bottom eyes - - - - -	14½
3	Strong eyes, that had sprouted - -	20½
4	Later eyes, that had not sprouted - -	16
5	Cut downwards, with protuberance - -	14
6	Cut upwards, without protuberance - -	14
7	Nipple eyes - - - - -	7½
8	As No. 5 - - - - -	20
9	As No. 6 - - - - -	14
10	As No. 7 - - - - -	5
11	Deep-eyed sets - - - -	11
12	Shallow-eyed sets, disposed to nipple - -	11½
13	Deep-eyed, mixed with a red potato - -	8
14	Deep-eyed, mixed with a red potato - -	16

In other experiments, I have found no difference in the produce of the top and bottom eyes. I did not expect to have found the early sprouting eyes, so late in the season, producing more than the eyes that had not previously sprouted; and this is contrary to an opinion that has lately gained ground, of the advantages attending early planting, previous to the potatoes sprouting. The experiment is in favor of cutting the sets downwards; but not very decidedly so, for in 5 and 6 there exists no difference, yet there is a decided one in 8 and 9. The deep eyes do not appear to have an advantage over the shallow ones, even where they appear disposed to nipple; while the decidedly nipple-formed eyes are very unproductive. But the most extraordinary difference is between 13 and 14, in which I am not aware there was any difference in treatment or seed; they both had equally intermixed sets of a red potato, that produced none but curled plants, with a few small potatoes under them. Had it not been so, they would, I think, have produced at least half as many more potatoes, and number 14 would at least have equalled number 1; and these are so much more productive from their being the outside rows in the experiment, I feel assured. They are a further confirmation of what I have frequently observed before, that the produce of a crop depends much on its having a free space above the surface of the earth and not below it. * * * *

Now, I stated some time ago, in the *Irish Farmers' Journal*, an unexpected result in an experiment made, with other views, of a great return in two rows of barley, at a wide interval of three feet six inches, and in a part of another row, where a wide space was afforded it, these two rows giving three pounds 9½ ounces, and three pounds 6½ ounces; while none other of the rows, at 21 inches apart, gave more than two pounds 5½ ounces, with the exception of the part of another drill mentioned above. These two rows, therefore, though at so wide a distance, would, in an acreage calculation, have produced as much as the closer rows of 21 inches. A crop of grain, then, might be grown in drills, at this distance, as weighty as in any other way, and a crop of turnips, parsnips, or other low-growing herbaceous plants, at the same time produced. This is found also to be the case with beans. In the case mentioned in the earlier part of this paper, of my potato experiment, potatoes appear to follow the same rule—of increasing productions at increasing distances.

In the probable scarcity of seed in the ensuing season, this may be an

object worth attending to; an equal crop of potatoes may probably be obtained with one-fourth the usual quantity of seed, and a very fair crop of parsnips also got—an excellent substitute for potatoes should a disease similar to that of this year, which very probably may, visit them in the next. In drills drawn at 16 inches asunder, one row of potatoes and two of parsnips should be sown successively; this would give a distance of four feet for the potatoes. In beds made three feet wide, with a furrow of $1\frac{1}{2}$ foot, in like manner a row of potatoes should be planted along the middle of the ridge, and a row of parsnips near each edge. These operations should take place as early as possible in the spring, not only as the parsnip is a slow grower, and therefore requires early planting, but that the potatoes may be got into the ground before they begin to decay in the spring, which, I fear, is not improbable; for, in the rot which commenced in the neighborhood of Killybegs, in the county of Donegal, about fourteen years ago, and which brought on famine and desolation to many, and for many years ravaged the country, the disease did not show itself till the spring, and it increased with the increasing warmth of the season; and this present disease, although differing in mode and in appearance, bears, as far as my recollection goes, the same perfume, and communicates the same taste to the potato affected with it. I cannot too strenuously press these remarks on the Irish public, nor can I urge too strongly the absurdity of a nation trusting to one sort of vegetable for its food, and that one that has for these fourteen years been a failing one. We have a warning afforded to us this year. If we neglect it, the most dreadful affliction may fall on us and our children.

What has been partial this year may be total next. It is a blasphemous neglect of the warnings of the Most High, bearing a false semblance of faith, to say, "God is good," and refuse to listen to his voice, spoken in the pestilence. I know of no crop that can equal the parsnip as a substitute for the potato, nor one that the Irish palate can so soon reconcile itself to. I call for exertion. Humble as I am, let me not call in vain.

C.—ON PROCURING EARLY POTATOES.

It has been recommended to plant potatoes before the end of January, and my experience tells me it may be safely done; but I think an earlier crop may be insured by promoting the vegetation of the potatoes in a warm house; and I am told that early vegetation is assisted by mixing them with turf-mould. I would scoop out the growing sets in succession as vegetation appeared. Thus, in time, the whole of the eyes would be planted, and a single failure could scarcely ensue. By planting sprouted sets I obtained in Donegal a crop of well-grown potatoes by the middle of June. Last spring, out of 18 large cup potatoes, weighing $7\frac{1}{2}$ pounds, I took 176 fine scoops, one inch in diameter and one inch deep; they weighed $4\frac{1}{2}$ pounds, and I had $3\frac{1}{4}$ pounds of refuse, capable of being used as food. A statute acre, planted in rows four feet asunder, the sets being nine inches apart, would take only 14,520 sets, weighing only three cwt. one stone, with a refuse of two cwt. and three stones—altogether $5\frac{1}{2}$ cwt.; but this refuse fit for food.

It has also been recommended to plant the sets nearly in contact, but not

touching, on a headland, to preserve them till the regular time of planting out.

When the rot first appeared in Donegal, I secured, in a similar way, a crop of potatoes on two acres of ground, where I should, in the common way of planting, have lost all. I made a hot-bed early in the spring—it could hardly be called a hot-bed, for it scarcely heated—covered it with about two inches of earth, and laid scooped sets (which are more convenient for transplanting than cut ones, as they drop more rapidly into the holes made by the dibble) within an inch of each other on it, covering them with about three inches of earth, and commenced transplanting them as soon as they generally appeared above ground. They appeared, though, when three or four inches high, to sustain no check, even when planted out in hot, dry weather, so that they were kept covered from the sun, when taken up, until they were planted. I planted them as deep as I could, even to the covering them when they were not much above the ground in the bed. Although the sets were in many cases completely rotten—so much so indeed as to fall off when removing from the bed—yet there was no failure among them; but of a quarter of an acre that I planted in the common way, not one set succeeded. The early growth in the bed is, I think, accelerated by laying a little loose straw on the top of it.

From the Mark Lane Express and Agricultural Journal, December 1, 1845.

POTATOES.

Table of the number of sets of potatoes, and total weight of the same, required for planting an acre, at the following distances, each set containing only a single eye and weighing one-half ounce, the distance between the sets in the rows being nine inches.

	Number of sets per acre.	Weight of sets per acre. Cwt.	lbs.
Rows 18 inches apart - - -	38,720	10	90
19 do - - -	36,682	10	26
20 do - - -	34,848	9	81
21 do - - -	33,188	9	29
22 do - - -	31,680	8	94
23 do - - -	30,302	8	50
24 do - - -	29,040	8	11
25 do - - -	27,874	7	87
26 do - - -	26,806	7	53
27 do - - -	25,813	7	22
28 do - - -	24,891	6	105
29 do - - -	24,033	6	79
30 do - - -	23,232	6	54

On poor soil, 18 inches between the rows may be considered a proper distance, as may be likewise the case with early, weak-stemmed varieties on any soil; and according to the vigor of the stems, richness, and depth of the soil, the distance may be increased to 30 inches, which is wide enough for the strongest growers, even on rich soil. It is to be remarked, that in some varieties the eyes are not abundant. With regard to such, the above number of sets will not be obtained from the corresponding weights, but in general it will be practicable, provided sound-eyed tubers can be employed. It is a *minimum* weight for an acre, but will probably have to be considered enough.

ROBERT THOMPSON.

RESULT OF A CHEMICAL EXAMINATION OF AN ASSORTMENT OF POTATOES AT HOHENHEIM.

BY PROFESSOR SIEMENS.

[From Riecke's Weekly Journal of Agriculture and Domestic Economy, 1843, No. 20: translated from Dingler's Polytechnic Journal, volume 88, page 374, by E. Goodrich Smith, of the Patent Office.]

In order to learn more closely the proportion of constituent parts of the potatoes here cultivated, they were subjected to the following chemical examination, and gave the following results:

The examination of these potatoes was made in the month of November of the previous year. At the same time was determined the *specific weight*, in this manner: A potato of middle size, after having been carefully cleaned, was accurately weighed, then fastened by a fine thread under the scales, and dipped into a wide vessel of water. Afterwards, before the air bubbles appearing in the water on the potato had passed off, the scales were again brought to an equilibrium, and the loss of weight which the potato had suffered by being dipped in the water ascertained. The first ascertained absolute weight of the potato, divided by this loss of weight, gave its specific gravity. Larger and smaller potatoes of the same kind exhibit, for the most part, somewhat less specific weight than those of the middle size, which usually weigh from 1,000 to 1,500 grains.* The contents in starch, fibre, albumen, extract, and slime, were determined in the following manner: 6,000 grains of clean potatoes were grated on a grater made of tin, with perforated holes. The holes of this grater were half a line distant from each other; and so there were 37–38 in a Wurtemburg square inch. The pulp obtained was washed in a hair sieve which had 1,600 openings in a square inch. Before the fibre became dry it was pounded in a mortar as long as any large portions remained visible, and then afterwards washed out again, so that the existing starch was wholly obtained. As soon as the

---

* A comparison of these results with the earlier published specific weight of an assortment of Hohenheim potatoes, shows some very remarkable differences. Investigations repeated in future years can only explain this: whether it be owing to difference of the season or a gradual deterioration of some kinds, or whether or not, generally, the specific weight in particular tubers of the same kind differs more than usual. The cause may often lie in the different degrees of ripeness; as, for example, the lesser specific weight this year of the blue filder potatoes entirely corresponds therewith, as this kind last year was not commonly ripe, and therefore was small and unpalatable; while usually they belong to the most mealy.

liquid showed itself over the starch it was poured gradually from the bottom on a dry filter of known weight, on which remained the portion which did not pass through, which was afterwards dried, and is marked as the *slime* or *residuum.* This residuum appears to consist in part of unripe starch, with some impurities.

The remaining *starch*, after repeated washings with pure water, is dried at a temperature of 25 to 30 Reaumer, as long as any loss of weight can be perceived. This is very different in different kinds, in reference to fineness and color, on which account attention should be paid in further experiments for this purpose on the same kinds of potatoes.

The liquid filtered from the residuum was immediately evaporated to one-third of its volume for the separation of the albumen, and the coagulated albumen separated by filtration. The quantity and condition of this showed itself likewise to be different in kinds of potatoes grown on the same soil, and with the same manure, but of which the quantity will be here given, as we have reserved the different conditions of the same for a further examination. In all the statements respecting the quantity of the essential constituents of potatoes, as well in respect to their use in distilling of brandy as in reference to table use and for fodder, the albumen of the potato is considered not in the degree it deserves to be, in regard to nutritiousness of albumen, in a selection of potatoes for table use or fodder.

The liquid filtered from the albumen was immediately evaporated without further regard to dryness, and brought into the reckoning as *extract.*

Analysis of an assortment of potatoes in Germany.

No.	Names of potates.	Specific weight.	Dry substance, in per cent.	100 parts give—				
				Starch.	Fibre.	Albumen.	Extract.	Slime.
1	Red horn potato - -	10.95	25.90	15.81	4.36	1.66	3.28	0.50
2	Yellow Jacob - - -	10.95	25.25	16.60	3.81	1.01	3.38	0.75
3*	White heart - - -	11.02	26.50	15.06	4.78	2.06	2.78	2.00
4*	Early cucumber - -	11.01	26.46	17.73	4.50	1.71	2.45	0.50
5	Purple marbled - - -	10.92	25.06	16.66	4.53	1.55	2.20	0.75
6	Clear red palatine - -	10.91	21.71	15.13	4.15	0.66	2.03	0.75
7*	Biscuit - - - -	11.07	28.60	18.45	5.50	1.50	2.00	0.33
8	Black marbled - - -	11.01	24.43	15.60	6.66	0.50	1.00	0.66
9*	Rokes - - - -	11.08	27.50	18.40	5.15	1.50	2.60	0.85
10	Seedling - - -	10.83	24.40	15.60	4.03	0.90	2.70	0.50
11	False arakatscha - -	10.92	25.06	15.00	4.53	1.00	2.53	0.36
12	Noble wooded almond - -	10.94	24.40	15.40	5.73	0.55	3.30	
13	English kidney - -	11.00	26.50	16.73	4.75	1.63	2.00	1.00
14	Vinland - - - -	11.06	26.21	16.75	5.55	0.75	2.00	0.53
15	Larch - - - -	11.06	27.70	18.76	4.83	1.30	2.36	0.58
16	Strawberry - - -	10.99	28.23	18.23	4.66	1.85	2.55	0.86
17	Best table - - -	10.95	25.10	16.76	4.00	0.94	2.03	0.55
18	Prize of Holland - -	10.98	24.50	17.06	4.20	1.16	2.60	
19	Prize of Westerwald - -	11.01	24.10	14.60	5.30	0.90	1.46	0.70
20	Onion - - - -	10.99	26.66	15.60	5.23	1.01	3.50	0.73
21*	White - - - -	11.01	26.53	15.00	5.13	1.40		
22*	Early long kidney - -	11.00	26.66	16.75	7.30	1.50	3.00	1.00
23	Sugar - - - -	10.86						
24	Little Scotch - - -	10.95	24.65	17.23	3.61	0.85	2.33	0.56

Analysis—Continued.

No.	Names of potatoes.	Specific weight.	Dry substance, in per cent.	100 parts give—				
				Starch	Fibre.	Albumen.	Extract.	Slime.
25	Little mouse - - -	10.80	18.80	11.16	4.30	0.73	3.00	
26	Yellow - - - -	10.95	24.75	17.48	3.80	1.05	2.33	0.51
27	Peruvian - - -	–	25.66	12.53	8.00	1.16	3.00	0.66
28	Pine-apple - - -	11.00	25.25	15.50	5.73	0.96	2.00	1.80
29	Spanish - - - -	11.05	23.38	15.11	4.76	0.51	2.61	0.66
30	English - - - -	11.06	27.03	14.70	9.00	0.50	1.66	1.25
31	Wuchefelder - - -	10.88						
32	Round blue marbled - -	10.89	25.26	13.26	6.98	0.95	2.45	1.00
33	Black horn potato - -	10.91	24.58	14.60	5.33	1.21	2.50	0.83
34	Pommeranian - - -	10.89	25.43	15.83	4.40	1.00	2.88	1.38
35*	Brazilian - - -	11.02	26.30	16.46	4.70	1.08	1.76	0.51
36	Wild - - - -	10.86	23.63	15.00	4.75	0.75	3.00	0.33
37	Bastard - - - -	11.11	27.16	17.53	5.03	1.20	1.50	1.70
38	Good Walderin - - -	10.91						
39	Ever-blooming - - -	11.04	24.03	15.15	4.91	0.88	1.70	0.33
40	Genuine little Zealand - -	10.90	23.16	15.33	4.91	0.50	2.60	0.20
41	Dutch winter - - -	11.01	23.66	15.53	4.71	0.78	3.18	0.40
42	English kine - - -	10.81	22.76	15.73	4.20	0.75	2.00	0.60
43	Earliest English forced - -	10.85	23.10	15.76	4.86	0.80	2.66	0.40
44	Round blue filder - -	10.89	23.40	14.50	4.86	1.26	2.98	1.21
45	Corsican - - -	11.00	25.60	16.23	5.50	1.50	2.33	0.96
46	Von Hamm - - -	10.91	22.06	15.78	5.25	2.01	3.00	0.50
47	Early fine English mealy -	10.97	23.90	14.30	5.66	1.06	2.70	1.00
48	Early fine American mealy -	–	24.15	16.71	4.01	0.50	2.40	1.00
49	Early fine English Manleys -	11.02	24.36	17.11	–	1.50	3.00	0.10
50	Large early Juniper - -	11.04	18.66	15.60	5.56	1.86	3.63	1.86
51	English mealy roast-beef -	11.05	26.60	16.05	6.00	1.70	2.33	1.00
52	English asparagus -	10.79 10.95	24.21	15.03	4.96	–	3.00	0.66
53	Fine new everlasting - -	10.87	25.43	16.55	4.58	1.00		1.00
54	Black variegated wax - -	10.97	25.20	14.33	5.23	0.66	2.73	0.50
55	Great Otmann - - -	10.86	24.25	14.78	4.43	1.00	3.00	0.50
56	Black, (from Algiers) - -	10.89	23.70	15.91	4.63	0.75	3.00	1.00
57*	Dellisch, (from Pyrmont) -	11.07	28.00	19.25	5.66	1.63	2.00	0.36
58*	Large long kidney - -	11.04	25.60	17.66	4.66	1.30	2.40	0.80
59	Rohan - - - -	10.75	21.00	14.26	5.20	0.66	1.53	0.50
60	Irish - - - -	11.08	27.91	17.55	8.10	0.66	2.00	0.66
61	White, (from Donawert) -	10.91	24.61	–	5.30	1.70	2.00	1.20
*	Marrowy - - -	11.05	26.66	17.56	5.30	1.50	3.00	0.50
*	Dettinger - - -	11.04	26.50	17.66	4.50	0.75	3.00	0.50

NOTE.—Those which are marked with a star [*] seem to be particularly valuable on account of their constituent parts.

APPENDIX No. 5.

POTATO ROT IN THE UNITED STATES.

From the Albany Cultivator.

DISEASE OF THE POTATO.

Mr. Tucker: The subject of the disease which last year prevailed so universally among potatoes is one which has very naturally and properly called out the inquiries and conjectures of many investigators, and as yet no particular cause for its existence seems to have been concluded upon by the mass of cultivators. Some suppose that the membranes of the leaf are destroyed by an insect, and that the work of decay originates in this cause.

But of this theory—for it is theory, and nothing more—we are prepared to say that we saw (and so did every observing farmer, we must think) hosts of small black flies infesting potato fields in years long before we ever heard of the disease in potatoes, and the usual consequence was that the membrane of the leaf was eaten out, as somebody, in some particular instance, saw it last fall. Then, again, in proof of the innocence of the poor insect (who is certainly driven to rather hard fare, even for a mischievous fellow) in this matter, we must say that we saw with our own eyes, and no mistake about it, leaves of potatoes after they had become dry by the disease, as perfect in all their parts as any potato leaves we ever saw. Others are of opinion that the cause of the disease is owing to the "influence of a worm in the root;" but we have seen no statement of such animals being found in such locations until the disease had made some progress; so there must be some doubt in the case as to whether the worm does the mischief, or is attracted by the consequences of its having been done to feast on the corruption that ensues.

Last fall we ventured an opinion on the cause of the disease, which as yet we have found no cause to relinquish; but, on the contrary, from the facts we have collected and observations we have made, we have become more tenacious of its correctness. It was simply this—that, from some cause which we did not then and cannot now define to our own satisfaction, the potato vine was attacked with a rust similar to that we frequently see on the straw of rye and wheat; that, in the case of the potato, it first showed itself in a very small blotch on the side of the stalk, which continued to spread until it had gone round and through the stalk, when the latter, at the particular point of disease, became dry and hard, as though it had reached its maturity. The death of the top of the stalk of course soon follows, but the lower part remains green for a while. The conjecture (it was mere conjecture) we threw out was this: whether the sap which was now stopped by the dryness of the stalk in its usual channel of circulation, and of course prevented from passing into the leaf, its natural laboratory for preparation to return to the tuber and fulfil its accustomed service in giving it nourishment, did not necessarily return prematurely, and, either from excess of quantity or by bringing back some quality which had better been given to the winds, induce the disease in the tubers? Our own potatoes were too far gone to experiment much upon, when we, surprised with the novelty of the action, hit upon a single plan to adopt. It appeared to us, however, as soon as we saw *how* the mischief was progressing, that mowing

the tops was the best and perhaps only efficient method to pursue. A neighbor, whose crop was smitten long after our own, tried this experiment by mowing about half a field as soon as the tops exhibited symptoms of the disorder, and the result was satisfactory and cheering. Where the tops were so mown no appearance of the rot was ever discovered, and the potatoes gave all the evidence of maturity which the circumstances of the case could possibly admit of, while the other part of the field suffered as much from the rot as any in the vicinity. Here, then, is one instance in favor of our theory.

Other experiments were tried, of which we shall cite but one or two. In one case, a farmer dug a very few hills when the vines first showed symptoms of disease, and carefully buried them and let them remain until the usual time of digging, when they were taken out all sound, while the most of his crop had suffered essentially. There can be no doubt, we think, that when potatoes are dug so early as the rot came last year, they must be put in small bodies and kept cool, and excluded from the atmosphere. Their tendency to heat, and thus become heavy and insipid, warrants us in that conclusion; and so we infer that the letting them remain in hills with the tops taken off until the usual time of digging is a much cheaper and better way than to dig and put them in cellars, or on floors in piles.

Another course of proceeding which has come under our observation was adopted by some Irishmen, who had known this enemy to their favorite esculent "in the old country," and which it may not be useless to mention. When they saw the crop smitten, they dug it immediately, and piled the potatoes on the surface of the ground, taking care to guard them from sunshine until the job was completed, when they covered the pile entirely with clay. The result was probably as they had known it to be aforetime. Their crop was saved, and their potatoes of *good* quality. The clay undoubtedly acted as a two-fold agent—kept them cool, and excluded the atmosphere and storms.

We have only to say, in conclusion, that if any one can confute any point we have advanced, we shall be happy to have him do it. Truth and light are what we are looking after in this matter, and if we have advanced an error, the public good requires that it should be set right. And especially does the agricultural interest of our country require that this pestilence, which made such rapid strides in its advancement the last year, should meet with hot pursuit by every philanthropist, until its progress is stayed, if not effectually stopped.

Yours, truly,

W. BACON.

P. S.—There have been many experiments in planting potatoes tried in this region this spring, with reference to preventing the disease. If any thing of importance results from them, I shall give dne notice.

MOUNT OSCEOLA, *Mass.*, *June* 22, 1845.

From the Albany Cultivator.

POTATO ROT.

We give the following from a letter from Hon. John Crary, of Salem, in this State. His suggestions are worthy the consideration of our farmers:

" *The cause of rot in the potato, and the way to prevent it.*—The rot in the potato occurs in hot, dry seasons, and the heat and drought prevent the ripening of the potato, and disease and decomposition follow. I observed during the last summer a difference in the potato crop on the same land. Those potatoes that were covered deep were good as usual; those the covering of which was shallow, were useless, particularly for the table. The first symptom of failure is in the stalks of the potato; they become dry, and the leaves turn black; the growth then ceases, and the potato becomes rotten before it is ripe. The fibres that connect the stalk with the potato quit their hold; and when you grasp the stalk and pull with a view to raise the potatoes out of the hill, the roots break and leave the potatoes, or rather slip out of the hill without raising them."

Mr. Leroy Patillo, Monroe, Georgia, writes us that he thinks the rot is caused by small insects, and advises rolling the seed-potatoes in sulphur before planting them. He informs us that he has used sulphur with good effects around plum trees in which insects had perforated the bark, and from which the gum oozed out.

From a letter received from Elisha Hammond, of Conesville, N. Y., we extract the following facts in relation to the rot in potatoes:

1. "On dry, cool land, not very rich by putrescent manures, the crops almost entirely escaped."
2. Defective potatoes fed to hogs, in connexion with sulphur and charcoal, have produced no injury.
3. In a field of potatoes, some of the rows crossed places on which stumps had been burned, and other rows a spot where potatoes had been buried the year before, and the straw used about them turned under for manure. The crop was much more rotted on these places, especially over old potato-holes, than elsewhere.
4. Lime has been said to be a preventive of rot. It proved *not* so in this case. Some coarse lime had been spread on a part of the field. Some hills where the lime happened to be scattered were particularly examined, and found much more rotted than where nothing was put.
5. Plaster was used on most of the crop. Two rows were left through the field without plaster—no difference could be discovered between these and other rows, in the condition of the potatoes.

From the Worcester Spy.

POTATO BLIGHT.

I grieves us to state that the blight which caused such destruction to the potato crop last year has thus early commenced its ravages the present season. We have examined a field belonging to Governor Lincoln, which, we are assured, exhibited a perfectly healthy appearance on the 3d inst. On the 5th, portions of the vines showed indications of disease, and on the 7th about one-half of them were more or less shrivelled, many of them shrunk to one-half of their former dimension, and some of the leaves already turned brown and nearly dry. The potatoes were of the red variety, sometimes called the peach-blows. The seed was selected, and in a fine and apparently healthy state. We opened one of the hills most affected

with the disease, and found the seed still sound and apparently healthy. Some of the new set potatoes were about the size of a robin's egg, and looked well. So far as we observed, the disease appears to commence at the upper part of the vine.

We invite the particular attention of farmers to this subject. We hope that such careful and accurate observations of the commencement and progress of the disease, the present season, may be made and recorded, by men of judgment, as will lead to some more conclusive indications than have been heretofore obtained of its origin and causes, and that they may result in the discovery of some efficient and adequate remedy for the appalling evil—an evil that threatens the destruction of a crop which affords one of our most abundant and most wholesome articles of food.

Mr. Pearce, of Hamburg, who is an excellent and observing farmer, saw that his potato vines were affected, and pulled several hills to examine the roots. They were sound, and left separated from the stems or tops. By this separation these hills wholly escaped the rot, while the potatoes in all the adjoining hills were rotten at the time of harvest.

From the Albany Cultivator.

There are two facts which I observed in my field, which I have not seen noticed in your paper. The first is, that the disease was confined to the tubers nearest to the surface; those lying deep were unaffected. The second is, that the rotten potatoes were full of long white worms. I saw nothing which looked like fungi, with the naked eye; but it did not occur to me to examine them with a microscope. The odor was intolerably fetid.

N. N. D.

For the Indiana Farmer and Gardener.

POTATO BLIGHT.

Mr. Editor: I have just returned from an examination of my friend Robert Morrison's potato patches. A disease not heretofore noticed in this section of the country has attacked many of his vines; and, that the readers of this paper may be made acquainted with its character, I proceed to give the results of our researches. In all cases of inquiry into causes, I conceive it to be important to right deductions that we should first lay a broad foundation of accurate observations. When these observations are sufficiently numerous and rightly arranged, a correct theory springs almost spontaneously out of them.

My present purpose is merely to aid in accumulating data, and to distinguish this from any other affection to which our potatoes may be liable.

1. There are three different lots of potatoes which we examined. One patch was planted so early as to have been prostrated by two successive frosts. The other two patches were planted about nine weeks ago.

2. One patch of the late planting is in a well-manured sod ground; the others in a poorer soil.

3. All these lots are affected with the disease; but the frosted potatoes the least.

4. The disease, in every instance, was found to be confined to the *vines*. These were affected generally near their entrance into the earth—a few inches below it, and a few inches above it.

5. A person, in a general review of the field, would perceive nothing but a luxuriant crop of potatoes; on passing watchfully along the rows, he would discover here and there some prostrated vines with *wilted* leaves. On close inspection he would find, at the points named, a perfectly *dry* decay of the stem: the pith is entirely gone; the cuticle is also removed or dried to imperceptible thinness; and nothing remains but the ligneous fibres, whitened by disease, and sometimes separated laterally. This is the worst stage of the disease yet observed. The parts below this point are perfectly sound at present.

On turning to other stems indiscriminately, whose leaves and vines are apparently in the full vigor of health, we perceive the earliest encroachments of visible disease. Here we see a little discolored patch of cuticle dried up and sunken to the ligneous fibres below; the parenchymatous matter among the cuticular tissue having disappeared. Let us gently scrape away this dead cuticle, and we shall find the ligneous texture yet living; but in the next plant this is also decayed; and in still another we witness the destruction of half the pith; and in another the pith is all gone; and then we arrive at the last stage, or total rottenness. In most instances there are several such patches of cuticular decay, of irregular figures; but there is a well-defined line of separation between the dead and living parts. Let us slice, longitudinally, one of the vines in which these spots of decay have penetrated into or through the pith, and we shall find portions of solid and apparently sound pith in the intervening portions of the stem.

6. In several instances the returning sap being interrupted in its descent by the cuticular decay, formed small tubers (perfect potatoes) just above the diseased point.

7. In a very few cases the blight had affected the branches of the vines; and in as few cases the decayed pith was found in a slushy state.

There is no apparent erosion of the cuticle; but the idea is suggested of all the pulpy matter in it being abstracted, and the cuticular film collapsing upon the parts beneath.

We may safely say, upon these observations, that the disease undoubtedly commences on the *exterior* of the vines; and that the upward circulation is continued long after the downward current is partially, if not wholly, intercepted; that the disease tends to penetrate *into* and not to pass along the vines; the tops perishing only when no nourishment can be obtained from below.

If the tubers should become affected, I will endeavor to report the facts, unless anticipated by others.

J. T. P.

From the Boston Cultivator.

THE POTATO BLIGHT.

The Bennington Gazette says that Milton Burrill, of Stockbridge, has been investigating very fully the subject of the disease, and is now fully con-

vinced that he has discovered the true cause in the shape of an insect. He showed us a sample of the insect, which, through a strong magnifying glass, looks formidable, though so small. He is convinced that every potato field in that vicinity is destined to fall as last year. He has visited many gardens and fields around us, and finds them all giving evidence of disease. If the cause is discovered, we hope the scientific in our laboratories will soon make known some practical way of getting rid of the enemy—though we fear the remedy, if discovered, will be too late to save the present crop.

We have understood that house ashes, spread on the hills around the vines, after they have grown a few inches from the ground, is not only a remedy for the blight, but greatly facilitates the growth of the potato on some soils. It is very easy to make the trial.

The editor of the Genesee Farmer, Dr. Lee, has made extensive examination of the potato crop throughout central New York, and finds in all cases that the curling and blight of the vines is attended by an insect. The parent is probably the beetle. It punctures the vine just above the ground, and deposites its egg in the pith of the stalk, where it hatches. The larva eats off all the stalk but the outer bark, when the vine withers and dies.

Dr. Lee thinks that this prevents the ripening of the tubers and disposes them to decay. The blight, it is found, will be even more destructive than last year.

From the Northampton Courier.

DISEASE IN POTATOES.

We were this morning shown, by Dr. D. Stebbins, a potato leaf taken from vines in his garden, upon which insects or worms had commenced their ravages, which proved so disastrous last year. The leaf was nearly consumed, and the insects were yet busily at work. Dr. Stebbins is sprinkling his potato vines with tobacco liquid, and finds it to be an effectual remedy. Will others try this method of exterminating these destructives?

From the Massachusetts Ploughman.

POTATO BLIGHT IN MAINE.

Mr. Editor: Hastily I drop a few lines in relation to the "potato blight" (so called) in our place and vicinity. I am sorry to say, in the opinion of many here, from present appearances, our crop will be shortened more than one-half. There is, however, some uncertainty how this may turn out. Certainly, appearances are bad enough.

I have examined one or two pieces affected, and find the *blight*, if so it may be called, caused by an insect of the species *aphis* or *plant-louse;* and so rapid is the ravage in some fields, that the tops bear somewhat the appearance of having been touched by the frost. Probably, wherever the insect attacks, the tops will prematurely die. We would caution farmers not to be in too much haste to harvest their potatoes, though the tops may be dead. The bottoms, by remaining the usual time in the ground, will be

likely to improve. Besides, I am inclined to the opinion, by letting the potato remain in the ground till the proper time to dig may tend to make it keep better after it is dug.

We hear the same complaint made in many other places. We hope farmers will be observing on the subject, and note as many facts as possible. For one, I intend to watch carefully the progress of this *blight*, (or perhaps more properly termed insect ravage,) and note the result. Perhaps I may find occasion hereafter to add more on the subject. For the present I conclude by saying this insect, most likely, is the cause of the rot in the root. We shall soon see.

Respectfully,

B. F. WILBUR.

Butters-vale, *August* 26, 1845.

We approve of the practice of letting potatoes remain in the ground till they are fully ripe. As to the cause of the rot, we are uncertain.—Editor.

From the Massachusetts Ploughman, Sept. 20.

PLANT-LICE ON POTATO VINES.

Mr. Editor: Since my letter, hastily written the other day, I have observed and thought more upon the subject—the substance of which I beg leave to lay before your readers.

Naturalists have described numerous parasitical insects; but among them all I do not find a single description in the books which exactly answers to the *aphis* of the potato—for so I shall term it. It is, however, so like the aphis of other plants, it cannot be mistaken as to its class. I never have seen any thing of the kind on potatoes before; others perhaps have.

Perhaps it may be a matter of interest to some to have a brief outline of the insect. It is of a transparent green color, varying in size from that of a tobacco seed to that of a duck-shot; the largest sized have wings. They are generally found on the under side of the leaf; wherever they feed, the blight shows itself; the probability is, they extract the vegetable juice or sap, the loss of which to the plant causes the mischief. If only the stem of the leaf be attacked, the whole leaf withers and dies.

I remember, when the blight struck my potato crop in 1838, the tops looked at that time very much as now. The bottoms also were then affected. But I did not think, at that time, to look and see whether any insect preyed upon them, as now. I think, however, most likely they did. Last year I did not notice much that appeared like blight in my potato field, though the bottoms, in spots, were some affected with the rot at harvest time.

I know no remedy to apply as a preventive, or that will stay the work of mischief after it is once commenced.

Whether any peculiarity of the present season can be said to give rise to this pest or blight, is perhaps difficult to determine; (the season here, from the middle of July up to the present time, has been uncommonly warm and wet;) or whether *this blight* will be followed with disease in the root, similar to that of last year, is a matter as yet alike undeterminable. Time, however, will soon tell. It is to be feared the rot will follow.

It is to be hoped farmers will (for they of all others have the best opportunity to) be observing upon the subject, and note as many facts as possible for the general good of all who cultivate this useful root.

Potatoes, in this vicinity, up to within about ten days or a fortnight, have looked very promising of a heavy crop. The reader is aware, I suppose, vegetation *here* is much later than in Massachusetts. *There*, probably, the potato crop is now nearly or quite ripe; so that, if the disease prevails there, it must have commenced proportionally earlier to cut off the crop.* How is this?

Perhaps there is no crop grown in New England, excepting hay, the loss of which would be more severely felt than that of the potato. It is justly a valued root; it constitutes a cheap and wholesome food for man and beast; and it is sincerely to be hoped we are not to be deprived of it.

After all, let us not be too much alarmed; it may not prove so bad as now appears supposable; or, if we should be in a great measure deprived of this valuable vegetable, let us reflect, the Hand that gives has an equal right to withhold. Let the Most High reign, and man be wise and adore!

If any thing further in the progress of the disease, worthy of remark, should occur, I shall endeavor to communicate. Hope others, where the disease prevails, will do the same.

Respectfully,

B. F. WILBUR.

BUTTERS-VALE, *August* 30, 1845.

From the Massachusetts Ploughman.

POTATO CROP IN MAINE.

MR. EDITOR: I have just returned from Dover, the shire town of Piscataquis county; in passing to and from which my way lay through several of the best farming towns in the county—Sangersville, Foxcroft, and Guilford. The farmers in these towns tell me their potato crop this season is nearly or quite a failure—some will hardly get the return of their seed at harvest. I was at the trouble of examining several fields, and in every instance found the *aphis* preying more or less on the tops. The rot, as apprehension was expressed in a former communication, has set in. No one can tell how far the disease will extend. Fears are entertained that the crop will be entirely lost, whether harvested early or late. I think, of the two, late harvesting the safest. My reasons could be given if necessary. Some have essayed to save their crop by immediate harvesting and selling to shippers; but shippers are afraid to buy, fearing the mass would rot before it could be transported to a foreign market and disposed of.

I shall not attempt to theorize on the subject of this potato disease, (for so, I suppose, every body is agreed to call it,) though I am strongly of the opinion the *lice* on the tops are the sole cause of it. It is very natural to suppose a premature decay of the tops will have a corresponding effect upon the bottoms.

* Since writing the above, I learn, by the Ploughman of August 23, that the drought is so severe in Massachusetts the potato crop will be likely to be very light, and that the people there will be obliged to depend on Maine for a supply. It will be a sad thing indeed if we should not raise any to spare; and sadder still if we should not raise any to supply, which is feared by some.

Near the city of Bangor, I understand, some of the farmers are already engaged in ploughing in their potato crop, not being considered worth the harvesting.

The failure of the potato crop is regarded here in Maine (as well it may be) as one of the greatest calamities to the farmer's interest. It is to be hoped this trouble will prove to be of temporary standing—that another year it will not reappear.

Respectfully, yours, B. F. WILBUR.

From the Massachusetts Ploughman.

We presume the following communication is from the pen of the Hon. Morrill Allen. It is copied from the Old Colony Memorial:

POTATOES.

The disease in potatoes, which in some sections of the country nearly destroyed the crop of last year, has not yet progressed to any very alarming extent in the county of Plymouth. But there have been sufficient indications of its existence and advances to justify some general attention to the subject, and the employment of such preventive, or remedial means, as may seem to cultivators the most likely to prove efficacious. Until the the causes of malady shall be more satisfactorily investigated, no rules can, with implicit confidence, be given for the treatment. The farmers must do as physicians are sometimes obliged to do, in cases of undefined bodily disease—prescribe to the symptoms. This practice is attended with great uncertainty, yet the results of it in experience sometimes prove highly valuable. The different causes to which the disease in potatoes has been ascribed, lead writers to suggest a great variety of remedies in accordance with their views of the probable origin. Let farmers select and apply such as their reason and judgment best approve, and it may be that merely practical men will, in the course of their experience, clearly prove what theory has hitherto failed of doing—the moving cause of the difficulty. If, as supposed by some, it be of insect origin, then salt and lime would seem proper applications; and these are also strongly recommended by persons who think that fungus is the producing cause of the disease. Those who suppose it arises from atmospheric influence may properly apply the same means which would be recommended by those who believe it the result of excessive growth. Preparation of the soil, and a course in the cultivation likely to produce an even growth, is unquestionably important in this and other crops. Some persons seem confident that the rot in potatoes results wholly from deterioration in the seed. If this be true, we may not expect to avoid the evil merely by sending to another place for seed potatoes; we should renew them from the balls. This is a process requiring some patience, but we know of no easier method of entire renovation. We suppose renewal can be approached in successive plantings of unmatured potatoes. These have often been strongly recommended for seed, not only for the purpose of avoiding disease, but as a means of increasing the crop. It is manifestly contrary to what we regard as a general law in vegetation, that the most perfect seed produces the healthiest and most fruitful plants. There are, however, several reasons for believing that the potato may be an exception to the general law. The vegetative principle is not so concentra-

ted in the potato as in most other articles. It can be produced from the balls, the bulbs, or from sprouts which have grown in the cellar, or the earth. The vegetative principle being so widely diffused, it may be reasonable to suppose that the perfect ripening of the potato to some extent weakens its power of reproduction. That power, after the complete maturity of the bulbs, may be more perfectly concentrated in the balls. The experiment is easily made, and it is hoped that many farmers will this year plant potatoes for the next year's seeding as late as the 25th of June.

M. A.

Pembroke, *May*, 1845.

From the Farmers' Monthly Visiter.

We have not yet, in all the speculations of the curious and the scientific on the subject of the recent disease in potatoes, seen any thing to throw light enough to enable us to take a single step towards a remedy. In raising thirteen hundred bushels of potatoes last year, we had congratulated ourselves on an entire escape from the disease complained of by the most if not all our neighbors. We had disposed, to good advantage, of something like half of our crop; and we thought we should do better to save the remainder until the opening of spring, by then sending them to the Boston market. As the most safe kind, we had planted half the ground with long reds the two last years. In the fall of 1843 our long red potatoes were laid in the ground, in a bed not over two feet deep, covered with a coating of green hemlock boughs, and these covered with the surrounding soil, so that the winter frost could not reach through. The potatoes in the following spring came out as fresh and fair as they were on the day they were covered. Precisely the same way and near the same spot did we, in October last, dispose of about five hundred bushels of the long reds, the kind that were supposed to be proof against the rot, and near them, in a continued bed, about one hundred bushels of the round pink-eyed potatoes, an earlier kind. The pink-eyes came out as good as they were where they were covered; the long-reds were a mass of rottenness, so general that, of the whole quantity, not a bushel was taken out to be saved. We believe the potatoes suffered from the disease, because, a few days before they were dug, their growth was arrested by the sudden dying of the tops, which seemed to be stricken as with the blight, which frequently takes place at the earlier season. The vines being thus killed, we dug them perhaps a fortnight earlier than we might otherwise have done; and it was observed, when they were disposed of in their bed, that the skin peeled off easily. The top of the bed was kept open, as far as it could be done safely, until the approach of severe frost. We are inclined to think that the potatoes perished in consequence of being taken out of the air perhaps a fortnight too soon. Only a part of the same potatoes, dug at the same time, and laid in the bin of a cellar, above ground, adjoining to a basement kitchen, where a fire is kept continually, suffered from the rot; the potatoes remaining of these are some of the best we have ever seen at this season of the year. The potatoes of last year, disposed of in the same position, were greatly improved from the exposure to the air and heat from the kitchen; the long-reds of the present spring seem to have been benefited from the

same exposure; so that in the two positions of the years 1843 and 1844 the case was exactly reversed. We saved the potatoes where they were before lost, and we lost the potatoes where they were before preserved. Our belief is that the effects of the disease, which appeared on the killing of the vines, might have been avoided by keeping the potatoes in the ground until they were perfectly ripened.

Most strange and unaccountable is this potato disease. Sometimes we have seen one kind of potatoes (the Chenangoes for instance) half rotten at the time of digging, and some of them indicating the rot by specks on the end; while alongside, in the same field, other kinds of potatoes were entirely free from rot, or from all indications of disease. Other fields of the same kind of potatoes escaped the rot entirely. The richest soil seems to have been most liable to the rot. The high grounds of this State, the latest broken up pasture grounds, have commonly produced the best potatoes. Of last year's production it is believed that in these grounds the greater portion of the crop was lost; more than in the grounds where the blight had in former years been more common.

From the Massachusetts Ploughman.

DISEASE IN POTATOES.

Mr. Editor: Many, various, and often contradictory reasons have been given for the disease in potatoes the last season. Some have said it was caused by *wet* weather; others, in a different section, by *dry;* others by warm. Some have laid it to manure in the hill; others say, when there was none in the hill they were equally diseased. Some think lime, ashes, or plaster, has prevented the disease; others' potatoes, where these articles were used, have been as badly diseased as any. Some have laid it to the potatoes having been so long planted without reproducing from the seed. I have several kinds produced from the seed within a few years, and they were as badly diseased as any. Some lay it to a particular dew; others to a particular atmosphere.

Now, it is evident that these are not the causes of the disease. In York State it commenced two years ago; last year it was much worse, and reached this State, and will probably be much worse here this year than last.

This morning I examined my potatoes, and found some of the top leaves and stems dead, and many of them wilted; and among them a little bug, about the size of the cucumber bug, with a sharp beak, with which he was piercing the stems. On further examination, I found them on almost every hill; they were very active, and, by dodging or flying, would elude my grasp; wherever they punctured the stem, it would seem to wither almost as soon as if broken.

Now, my opinion is, that these bugs, by puncturing the stem, drawing off the sap, and perhaps poisoning it, are the cause of the disease; and the tops being thus affected before the potatoes are ripe, causes the root to rot.

On referring to Harris's Report on the Insects of Massachusetts, I find this kind of bug is the *Phytocoris lineolaris*, of the order called Hemiptera, and is described on the 161st page.

LEWIS FORD.

Cummington, *July* 14, 1845.

From the American Farmer.

POTATO BLIGHT.

To the editor of the Tribune :

Knowing that you feel a deep interest in the welfare of the farmer, I send you a few observations on the disease of potatoes, so prevalent last year, which I think I have discovered, and perhaps a remedy.

This morning, for the first time, I observed a few tops of the potatoes in my garden beginning to wither and curl up. Supposing that the cause might be near at hand, I commenced a critical examination of several withered tops, to discover it if possible. I soon found a green fly, about one-fourth of an inch in length, upon every top that had begun to wither, and on most of them two; some had four, a few six. On one top I found four young flies, about one-half the size of the adult, and on three others one each, about one-fourth grown.

The insect, I thought, must be the cause of the disease commonly called the curl-top or potato rot, since I found it on every diseased top in 30 or 40 cases, and usually on that part of the plant which had begun to wither near the healthy part of the stem. On the stem of one where the fly was, there was a small globule of viscid transparent liquid. This stem had begun to droop, but only so that it would scarcely be observed. Another globule on the upper side of the curled leaf, on which a fly was sitting, was found to be sweet. Many of the leaves that were much wilted felt as if a glutinous liquid had been spread upon the upper surface. These questions, then, naturally arose :

Does this liquid exude from the plant and attract the fly which is innocently sipping his nectar? or, does he perforate the stem and cause the exudation, that, like a malicious parasite, he may extract the life from this useful root? It appears to me that the insect must be the cause of the exudation, for this reason—that it was found on no plant that did not have a fly upon it.

In almost every case two flies were found upon the same plant, differing a little in size and color; the less being of a darker green, and the larger containing many eggs, which it appeared to be depositing. Only one egg was found in the stem of the plant; yet there were many places apparently stung upon the diseased stem, and the effect of this reached down in some cases three or four inches in the heart of the stem; otherwise were hollowed down as far as the healthy part.

From the above observations these conclusions appear to be evident—that the sting of this fly causes the curl-top; that it breeds upon the stem, and the numerous progeny live upon the plant, sucking up its juices and destroying its vitality. As a *remedy*, I amputated the diseased part, and destroyed all the flies I could. About 10 o'clock I sprinkled soap suds upon one small patch, and none were found upon it at night, though many were found upon another piece that was not showered. An hour before sunset I sprinkled the suds left from washing upon the whole.

The flies can perhaps be driven out of the field with a brush, where it is not convenient to shower them. Yours, &c. E. B.

POMPEY, *N. Y.*, *July* 14, 1845.

P. S.—Tuesday morning another examination was made, and only one fly was to be found on the piece.

Editorial remark.—We readily conclude that the green fly found on the potato vines as above described would affect the quality of the potatoes,

preventing their maturing; and, if left for any considerable time in the ground after the tops had begun to decay, would produce a second growth, by which the tubers would be rendered useless for cooking; but we doubt whether the fly here spoken of is the cause of the *general* rot which has been so prevalent of late years. We incline to the belief that rot is to be attributed generally to atmospheric influence—an undue or premature spring-like weather in early fall, causing the potatoes which are at a vigorous growth, though not fully matured or perfected, to begin to shoot or to grow in manner as though they had been planted for the purpose. This premature process ferments the tubers to an incipient state of decomposition, and hence the withering of the vines and the consequent deterioration of the crop. We are strengthened in the opinion by the same idea thrown out by Mr. *Gowen*, of Mount Airy—good authority, as all will allow—in his Report of Crops in 1843, as published 29th May, 1844, in the American Farmer, to which we would refer our readers.

For the Boston Cultivator.

THE POTATO MALADY.

Messrs. Editors: Your extracts from Arthur (see Cultivator for June 28) are interesting and deserving regard. There is reason in the belief, that the potato would be found to bleed less on cutting in the autumn than when cut at the time of planting; but to suppose that by such an arrangement the plague is to be stayed, is "all a hum," hundreds of acres, the past years, having been planted with whole potatoes, which ought, therefore, to have been thus preserved from disease; but these crops, as well as those produced from every "variety of seed, culture, soil, times of planting, different modes of manuring," &c., &c., have suffered alike and in the same degree. What need, then, of further witness?

Since writing the above, I have examined a field of ten acres of potatoes, about one-half of which were planted with uncut potatoes of small size; the remaining portion of the field being planted with cut seed, the operation of cutting having been performed at the time of planting, one eye in a piece; and it is but common honesty to confess, judging from present appearance, (the crop is now in bloom,) the uncut seed "have it." But this is a remarkably genial season, and there will, therefore, be no general complaint of "plague"—so the premiums offered by the "American Association" for the best essay, &c., might as well stand over for the present.

Our late crops of potatoes, those planted after peas, look finely; the late rains and very warm and growing weather having rendered them plague-proof. But let me relate a very curious fact, for the consideration of the learned. The day of planting my crop was excessively hot; but, except one row and a half across the field, the sets came up very regularly, which put me to a nonplus to account for such a singular and very perceptible failure; after a minute's reflection and investigation, I found that this row and a half had been left uncovered; the sets all the while exposed to a burning sun on a sandy soil, during the time the men were at dinner—say about two hours; and on calling on a neighbor who had complained of having just such a galled spot on his potato field, I found the very same effect following precisely the same cause—the exposure of the cut sets to the hot

sun at noon: so that, drawing the burning sand over these sets after two hours' exposure may be considered as somewhat like making a potato pie of them, and they were no doubt well cooked by the process; sufficiently so, at least, to prevent them from vegetating. C.

Gloucester Co., N. J.

From the Portland Bulletin.

DISEASE IN POTATOES.

At the farmers' national convention, held in New York city, the disease among potatoes was the subject of considerable discussion and remark. Mr. Robinson submitted an address to the people of the United States, urging the importance of investigations into the cause of this singular disease, which has hitherto baffled the efforts of science and experience to withstand its progress.

The farmers in Maine are particularly interested in this matter; during the past season, three-quarters of the potato crop of our State has been destroyed by this singular epidemic. The consistency and quality of the soil where the disease proves most destructive should be carefully noted; experiments should be tried of planting in new places and in different kinds of soil, with manure of every description now in use, and without any kind of manure whatever, and cognizance of any and every other circumstance calculated to throw the least light on the matter should be taken.

Gen. Tallmadge seemed to think the origin of the disease might be "in the natural course of vegetable decay and extinction of genera, so often observable in botanical history. He alluded to the extinction of the mammoth species of animals long ages ago—to the disappearance of the weed known as St. John's-wort, which but a few years since was the greatest enemy of the farmer, and is now so scarce as to be almost unattainable even for purposes of curiosity. He suggested that our farmers raise potatoes from the *seed* instead of the *root*, and also seek new kinds of potatoes in Mexico and Central America."

We think the suggestion of Gen. Tallmadge, of growing potatoes from the seed, an excellent one; hope our farmers will improve upon it, and will take all the other precautions calculated in any way to elucidate the subject.

Remarks by the editor of the Boston Cultivator.

Too much dependence is placed on obtaining new varieties of potatoes from the seed, with a view to prevent the rot. If the seed be selected from hardy varieties, that are known to resist the disease better than other kinds, some advantage may be gained. But the idea that the seed from a very tender variety will produce a hardy kind, is as absurd as it is to suppose that the offspring of a feeble, degenerate race of animals will be strong and healthy. The general law of nature is, that like produces like. Therefore it is important to select seed from a hardy race; and it would be well to plant several hardy sorts together, and then select from them, as in this way an improvement might be made by crossing.

For the Farmers' Cabinet.

DISEASE OF THE POTATO.

Mr. Editor: I have recently read a number of articles upon the "disease of the potato," and have been struck with what seems to me a deficiency in the reasoning on the subject. I formed an opinion in relation to the matter more than a year ago, in consequence of some investigations I then made, and subsequent readings and examinations have confirmed that opinion. I will give it to you for what it is worth. If it is not correct, perhaps it will lead to the truth—in which case I shall be abundantly repaid for my trouble.

It is well known that the substance forming the cells of all plants is a compound of nitrogenous matter with one or more of the alkalies, together with silex, &c. It is also well known, that if the cellular matter is deficient in alkaline substances, &c., it is comparatively weak, and unable to contain the matters deposited in it. It is well known, too, that the alkalies regulate the formation of the acids in the healthy vegetable, and that when there is not a sufficient supply of alkaline bases, the vegetable either contains a superabundance of acid or its growth is impeded. In the former case the vegetable is not fit for culinary purposes.

Now, I believe that in the case of the disease of the potato the cause is a deficiency of alkaline bases. This is manifest in the want of power in the cellular substance to perform its office, and it is also manifest in the presence of acid in the potato.

In consequence of this deficiency of alkaline substances, the potato plant forms an alkali peculiar to itself, which is very poisonous in its nature; and which, I doubt not, produces the fatal effect sometimes consequent upon eating the diseased potato.

If this theory be correct, the proper remedy is to supply the alkaline substances, such as lime, good strong ashes or soda, one or more of them; and not use quite so much or so rich manure as is commonly used.

Chemico.

Honesdale, *Pa.*

For the Farmers' Cabinet.

THE POTATO ROT.

Mr. Editor: Any information on the subject of the rot in the potato that even approximates to the truth is much needed at present. I hope you will not consider a column of your paper unworthily filled which contains a communication devoted to that object.

I stated in your May number that the rot in the potato was caused by a deficiency of alkaline substances. It is found, by burning the tops of the potato, that 10,000 parts yield 1,500 parts of ashes, while oak wood in equal quantity yields only 250 parts. This will serve to show the great quantity of alkali contained in potatoes over other vegetable matter.

The cellular tissue of all vegetables is composed partly of alkalies. They exist therein in a variety of forms; sometimes as carbonate of lime, at others as silicate of potash, at others in the form of phosphate of lime, &c. &c.

It is plain that if a plant has not sufficient alkali for the formation of the cellular tissue, its growth will be impeded, or the cellular substance will be so weak and thin as not to be able to perform its function of holding the starch and other matter contained in the potato. When the plant has not enough alkali, therefore, we may look for the cellular tissue to be broken and otherwise injured. This is actually the case with the potato that is affected with the rot. Mr. Teschemacher, a scientific gentleman of Boston, who has examined the rotten potato with a microscope, says "the cells appeared lacerated." This is what we would expect, especially when the substance contained in the cells is swollen by wet or heat, and the tissue is thin. In another place he says: "Indeed, it appears to me that the injury takes place by the rupturing of the cellular parts of the potato."

When the cells are ruptured the health of the potato is destroyed, and death and decay follow in the parts so ruptured. The decayed matter gives food to fungi and insects, and thus gives rise to the theory that the disease is caused by the fungi, or insects, instead of the want of alkali.

Again, when there is sufficient alkali to neutralize an acid, the acid is not to be found as such. It has entered into a chemical combination with the alkali, and assists in forming a salt. There is carbonic acid in a rotten potato, which is evidence that there is not alkali enough to operate upon it. If an alkali is placed upon some of the rotten potato, it instantly changes. Mr. Teschemacher says, in his letter to the New England Farmer, dated Boston, October, 1844, while speaking about his experiments—"A portion of the dark substance was placed upon a piece of glass on the microscope stand, in a drop of distilled water, and then thoroughly examined. A little salt on the fine point of a penknife was then added. A nearly instantaneous change took place. The dark colored masses separated; much of them seemed to pass away; and instead, there appeared numerous dark, slate colored globular bodies, which I easily recognised as the spores or reproducing bodies of the fungus. With the gray, slimy substance, the effect was still more striking. All the indistinct slime disappeared; the mass became clear and transparent, and left nothing but these innumerable dark globules floating about in the drop of water."

Salt is well known to be a muriate of soda. It appears evident, from Mr. Teschemacher's experiment, that the soda of the salt left the muriatic acid and entered into combination with the carbonic acid of the rotten mass, forming a carbonate of soda, and setting the muriatic acid free.

This carbonic acid is highly infectious, and hence the reason that a potato slightly rotten soon becomes wholly so, and infects those with which it is in contact. Any alkali will neutralize it, forming with it a carbonate. Consequently any alkali will cure the rot in the potato. This it will effect in two ways: First, by strengthening the cellular tissue, thus preventing the rupturing and consequent disorganization of the potato, which would result in death and decay; and, secondly, by neutralizing the carbonic acid, and thus destroying its infectious principle. [The writer here considers, and illustrates his views by, instances in the last report of the Commissioner of Patents. See T. Croft's letter.]

It is well known that poudrette, bone-dust, silicate of potash, and guano, contain one or more of the alkalies. I am disposed to think, Mr. Editor, that the above extracts prove conclusively the theory that the rot in the potato is caused by a want of the alkalies. At any rate, I should strongly

recommend their use. They can do no harm, unless abundantly used, and they may do an immense amount of good.

Yours, &c.,

CHEMICO.

HONESDALE, PA., *June* 6, 1845.

The foregoing we consider a valuable communication. Partly in corrobation of the views expressed, the editor recollects that in the use of lime on his farm there was no crop, unless perhaps it was the oat crop, on which that material had so uniformly a beneficial effect, as that of potatoes. The hints may easily be made use of, and at little expense.—EDITOR.

For the Farmers' Cabinet.

DISEASE OF THE POTATO.

MR. EDITOR: In perusing the last number of your paper, I noticed an article over the signature of Chemico, purporting to give a correct reason for the cause of the disease in potatoes, and also proposing a remedy.

It is a well known fact, that the disease in potatoes is of recent origin,* and it is also well known that the soil in which they grow contains the same quantity of alkali, and no less nitrogen than formerly. If a want of the alkalies, or a redundant supply of " nitrogenous matter," can be the only cause, then the disease might be confined to one district alone; but, observation, reports, and evidences, from well authenticated sources, affirm that the whole continent is alike affected: even in Europe the potatoes have not escaped the contagion. Lands which now yield but a poor and sickly crop of potatoes, a few years ago brought an abundant harvest. It has, furthermore, been ascertained by men of high professional repute that potatoes contain properties capable of accumulating the alkalies, and repelling a redundancy of nitrogen. Hence, it is easy to be seen that they are formed in such a peculiar way as to reject and throw off every substance detrimental to a vigorous and healthy growth.

Where, then, lies the true cause? It must be some uninvestigated agent, so powerful in its nature as to destroy the capability of the repulsive properties, and so poisonous in its effects as to paralyze the cellular organs, so as to prevent their performing their allotted task. Now, whatever may be the cause of the disease, it certainly cannot be the want or the redundancy of the above mentioned properties, to which Chemico attributes it.

I have noticed, particularly, that the first indications of the disease commence in the stalk; and, by an examination, I have found that the potatoes are fit for all culinary purposes, even when the stalk assumes a dark rotten color, and emits a putrid odor. As the disease follows down the stalk, the potato is at length affected, its health destroyed, and it becomes a useless vegetable. I have heard learned men say it is caused by an unusually large quantity of caloric coming in collision with a sudden and severe shower of rain; thereby creating a large quantity of hydrogen and sul-

---

*The recent origin of this disease is, we think, doubtful.—See the translation of a paper in the 7th No. of current vol. of Cabinet, page 212.—ED.

phuric acid gas. How far these doctrines are correct, I will not vouch; but suffice it to say, they seem to me plausible.

A Farmer.

Honesdale, Pa., *June* 2.

For the Farmers' Cabinet.

DISEASE OF THE POTATO.

Mr. Editor: In your last number I noticed a communication on the above subject, from this place, signed "Farmer."

The author of said communication seems to differ with me *in toto* in regard to the cause of the disease in question. He objects to my *reasoning** in the matter, and substitutes the *opinion* of some *learned men.*

After stating that the disease of the potato was of recent origin—by the way, Mr. Editor, your hint that this was doubtful was timely and proper, as we hear of the disease as far back at least as 1815, some thirty years ago—your correspondent, "Farmer," says "it is also well known that the soil in which potatoes grow contains the same quantity of alkali, and no less nitrogen than formerly. If a want of the alkalies or a redundant supply of nitrogenous matter can be the only cause,† then the disease might be confined to one district alone." I may be short-sighted, Mr. Editor, but I must confess I cannot see the *rationale* of this. I cannot for the life of me understand why "the disease might be confined to one district alone," unless that district should comprise nearly the whole earth, when the want of alkaline matter is so general.

"Farmer" lays it down as a "well known" fact, that "the soil in which potatoes grow contains the same quantity of alkali, and no less nitrogen than formerly." Now, however much I might be disposed to differ with "Farmer" in this matter, and say that when a soil has been deprived of a portion of its alkaline matter by taking off it large crops of hay, fodder, &c., and none or but little has been returned to it, it has less than it had before, I will, for the sake of making the subject clearer, omit doing so for the present. It is a "well known" fact, that all salts have a relative proportion of acids and alkalies. Therefore, notwithstanding the soil may have as much alkali now as it had formerly, still it does not follow, as a matter of course, that it has now a sufficiency. The soil formerly may have had enough alkali for the acid it contained at that time, but in consequence of the farmer supplying large quantities of manure, which produce an abundant supply of carbonic acid, the soil needs a greater supply of alkaline matter than it before contained, to form a salt by union with the extra quantum of carbonic acid. This is the main reason, in my opinion, that the rot in the potato is more general now than it was a few years ago. It has been the practice until recently to skin the soil as closely as possible, and supply but little manure; but since 1836, "a great change

---

* See page 316, current vol. of Cabinet. [See page 498, *ante.*]

†I did not say, Mr. Editor, that "a redundant supply of nitrogenous matter" was the cause of the disease of the potato; I said that "the substance forming the cells of all plants is a compound of nitrogenous (I should have said carboniferous) matter, with one or more of the alkalies, together with silex, &c. This has nothing to do with the cause of the disease of the patato, which, as I said before, was owing to a want of the alkalies.

has come over" agriculture, and farmers have been brought to think that they must give the soil something, while they are constantly taking away from it. They have since that time been throwing on large quantities of manure; and, not supplying proper proportions of alkaline matters, they find that diseases infest their plants, such as the rust in wheat, and the rot in the potato.

I must plead guilty to the charge that I am ignorant of the fact that "potatoes contain properties capable of accumulating the alkalies." The sentence in "Farmer's" communication containing this idea is very ambiguous to me; I do not understand it.

Again, he says, "it is easy to be seen that potatces are formed in such a peculiar way as to reject and throw off every substance detrimental to a vigorous and healthy growth." Not so easy to be seen, after all, Mr. "Farmer." If this was the case, how is it that the potato does not expel the "hydrogen and sulphuric acid gas," that "Farmer" seems to think is the cause of the disease? If they possess the power to reject and throw off every substance detrimental to a vigorous and healthy growth, how is it that they suffer the "hydrogen and sulphuric acid gas" to destroy their organism? It cannot be supposed that such destruction is one of the indicatives of a "healthy growth."

In regard to this matter of "hydrogen and sulphuric acid gas" being the cause of the disease of the potato, I have a few words to say. It strikes me that hydrogen cannot have anything to do with the disease; for if hydrogen be in contact with oxygen, the gas that *must be present* where decay is, they will unite and form water, and consequently the oxygen could not carry on the work of decay, and therefore the decay must stop. It seems more likely to me, after a few minutes' consideration of the subject, that the presence of hydrogen, so far from causing the decay of the potato, would have the effect of preventing it.

Respecting the other part of the theory of the "learned men" alluded to by "Farmer," that "sulphuric acid gas," thrown to the earth by those "sudden and severe showers of rain," is the cause of the widespread injury sustained by the potato, I would ask, what is there in the whole formula of chemicals that will destroy the effect of sulphuric acid in a more effectual manner than the very substances I propose for the prevention and cure of the rot in potatoes?

I am sorry that my communication is of so great length. I find that it requires fewer words to raise objections, than it does to answer them in a plain and explicit manner.

I should like to say more about the communication of "Farmer," particularly on the subject of the appearance of the stalks of the diseased potato. Their appearance justifies my idea of the cause of the rot, but I shall have to postpone it for the present.

CHEMICO.

HONESDALE, PA., *June* 19, 1845.

WILKESBARRE, LUZERNE COUNTY, PA.,
November 22, 1845.

DEAR SIR: The immense injury sustained from the "rot" by the potato crop of the United States, during this and former years, and the dis-

tress and alarm in Europe, at this time, caused principally by it, would seem to call upon every one who could say anything that seems at all reasonable of the cause and cure of that disease, to let himself be heard. With this conviction I address you this letter, wishing you to excuse the familiarity, and urging as my apology, if such apology be needed, the importance of the case.

And if you think I sustain my position, or establish, so far as a treatise of this kind could, the theory which I advance, you can so use this communication as to make it of service to the world at large, and thereby fulfil the intention of its author much better than he himself could.

I have abundant reason to believe that the "potato rot" is caused by a want of alkalies.

It would make this letter too lengthy were I to introduce *all* the evidence I have of the correctness of the theory I advance, and therefore I hope I shall be excused for ommitting a part of it. If, however, more is wanted, I am ready at any time to furnish it.

I will first speak of the theory of the disease. All plants, for a healthy growth, need certain elements *in certain proportions.* If more of one of these elements be given, by man or by nature, to the plant, than is proper to form a compound with the other elements, then the elements furnished are useless, if not injurious. I take some extracts from Dr. Liebig's great work on agricultural chemistry—one of the best works of the age on that science; the author of which is certainly entitled to full credit in his opinions, particularly when we have no evidences to the contrary.

The extracts are taken from the chapter on "the inorganic constituents of plants," and are as follows:

"Carbonic acid, water, and ammonia are necessary for the existence of plants, because they contain the elements from which their organs are formed; but other substances are likewise requisite for the formation of certain organs, destined for special functions peculiar to each family of plants. Plants obtain these substances from inorganic nature. In the ashes left after the incineration of plants, the same substances are found, although in a changed condition. Many of these inorganic constituents vary according to the soil in which the plants grow, but a certain number of them *are indispensable to their development.*" "Many plants, perhaps all of them, contain organic acids of very different composition and properties, *all of which are in combination with bases, such as potash, soda, lime, or magnesia.*" "But if these acids constantly exist in vegetables, and are necessary to their life, *which is incontestable*, it *is equally certain that some alkaline base is also indispensable in order to enter into combination with* the acids, *which are always found in the state of salts.*" "The perfect development of a plant is dependant on the presence of alkalies or alkaline earths; for when these substances are totally wanting, its growth will be arrested; and when they are only deficient, it must be impeded."

These extracts serve to show that alkaline matters are necessary for a healthy plant. Without stepping beyond the bounds of reason, we may well suppose that a plant which had not a proper supply of alkalies would be unhealthy; and when we consider the fact that carbonic acid is absorbed by all vegetable matter, and that *it is highly infectious when not neutralized*, causing decay where decay has not commenced, and assisting it after it has commenced, it appears to me the cause of the potato disease

may be very clearly seen. The cellular tissue of all vegetables is composed partly of alkalies. Hence, if the potato, for instance, has not sufficient alkali for a healthy growth, or, in other words, has not sufficient to enable it to assimilate all the carbonic acid it has absorbed, and thus form a strong cellular tissue, we may very naturally expect that such cellular tissue, if formed at all, will be very weak, and not able always properly to perform its functions. Such tissue, if anything occurs calculated to test its strength, will, we would suppose, be found, on examination with a good microscope, to be torn and ruptured. This it appears is actually the case with the diseased potato.

Mr. J. E. Teschemacher, a scientific gentleman of Boston, in a communication copied in your last report, on page 233, says, after examining the diseased potato with a microscope, that "many of these cells appeared lacerated." It is well known that water will cause vegetable matter to swell, and that heat will cause water to expand; hence if the cellular tissue be weak, and therefore not able to bear a strain, and the starch contained in the cells becomes swollen by water, *disorganization must inevitably follow*, more particularly so when that water is assisted by heat. As death and decay are the consequences of disorganization, the facts will explain why potatoes are so apt to rot during hot and wet weather. The cellular tissue may be weak; and yet if the weather be cool and dry, and as a consequence no strain comes upon it, that weakness may not essentially injure the potato; but if the weather becomes hot and wet, the cellular tissue must give way, and allow disease to do its work. This decay, however, may be stopped by the aid of the alkalies, even after disorganization has taken place. For evidence of this fact I refer you to the communication of Mr. John S. Netterville, published on page 229, in your last report, where he says: "But about the middle of December my family complained of the bad smell in the cellar; upon which I examined, and found the potatoes in a bad condition, and I took them out of the bin and picked them over again, and when returning them into the bin, in every layer I put about half a peck of slacked lime and mixed it well through them, and so on till all was in, which I do believe stopped the rot and bad smell, as there were but very few found affected afterward."

It would seem from the above statement that the carbonic acid, which is the product of decay, and which is, as I have before said, highly infectious, loses this power when lime is present; this is occasioned by the neutralizing effect of the lime, which forms with the carbonic acid a carbonate of lime, which is a salt. Berthier, in his "*Annales de Chimie et de Physique*," *tome* XXX, *page* 248, says: "10,000 parts of oak wood yield 250 parts of ashes; the same quantity of fir wood only 83; of linden wood, 500; of rye, 440; and of the herb of the potato plant, 1,500." It will thus be seen that the herb of the potato plant contains six times as much ashes as oak wood. Dr. Lee, a scientific gentleman of New York, who is at present, I believe, engaged by the New York State Agricultural Society to visit every county in that State and deliver lectures on agricultural chemistry, in a letter to the editor of the Albany Cultivator, from "Smithville, Chenango county, New York," dated July 15, 1845, and published in the August number of the Albany Cultivator, says: "More than one-half of the ashes of potatoes is pure potash." As every thing contained in a plant must be furnished by man or by nature, this will serve to show the necessity of

using *more potash* in the culture of potatoes than on any other crop; particularly if there be none of it already in the soil. Dr. Lee, in the letter already referred to, says: "A sugar maple, a grape vine, an apple tree, and a potato plant, *need a soil that* ABOUNDS IN POTASH."

Take from your fields 200 bushels of potatoes this fall, and you will remove from it sixty-three pounds of this mineral. One bushel of ashes are said, by those who have used them, to make *ten extra bushels of potatoes.*

If, therefore, potash be not present in sufficient quantities, we may reasonably expect that the potato will be impeded in its growth, if indeed that growth is not totally arrested. If, while the growth is impeded, the supply of carbonic acid be great, and the potato has an opportunity of absorbing it, such carbonic acid will, by its infectious properties, (even if there be a comparative drought at the time) disease the potato; and if such disease be not checked, it will totally destroy the potato. Carbonic acid loses this infectious property when it becomes a salt, by union with an alkali, and is then rather beneficial than injurious; for, if that alkali be *potash*, the potato plant will assimilate both the potash and the carbonic acid; and other conditions being equal, the result will be a large and *healthy* growth.

The foregoing remarks would lead us to suppose that by supplying the alkalies in sufficient quantities we would at least save our potatoes from the "*rot.*" Let us see if we can find any evidence to sustain us in that theory. If we cannot, but on the contrary find evidence against it, we should abandon it at once; but if we cannot find any thing against it, and all the evidence upon it is in its favor, it is certainly worthy of our attention.

If I had time, (unfortunately I am a poor man, and therefore have very little of that to spare,) and would take the trouble, I could give you the written certificates of several hundred men, who, when they have used alkaline substances in sufficient quantities upon their potato crops, *have never yet lost a crop by* "*rot;*" but, as such certificates would not be so satisfactory as some other evidence I am about to give, I will save myself the time and trouble of procuring them.

The first evidence I will offer is that of Dr. Lee, before mentioned. In the letter of this gentleman, from which I have already taken two extracts, I find the following: "More than one-half of the ash of potatoes is pure potash. Acting on this hint, I have found in my tour scientific farmers, who, by the use of unleached ashes, lime, and plaster, mixed in equal parts, and placed *in the hill* with the seed, *and on the hill* as soon as the tops have well grown, *have wholly escaped the potato rot, and harvested for several years from* 500 *to* 600 *bushels per acre.*" This would seem to be evidence enough to prove that experience sustains my theory. But I have more to offer: On the 88th page of your last report as Commissioner of Patents, it is stated, as coming under your own observation, that a composition containing an alkali (lime) had prevented the rot. It is also stated on the same page, that to prevent the disease, "salt, lime, and plaster" (all containing alkalies) "have been respectively recommended by their advocates, and in some instances with diverse success;" but, after several close examinations of your report, I can find nothing *there* which will go to show that substances containing alkalies, *when properly applied*, *have ever failed of* HAVING FULL AND COMPLETE SUCCESS IN PREVENTING THE ROT. On the other hand, I find considerable evidence going to sustain an opposite view of the case. Permit me to mention some of it. On the 224th page you will find the following, being a part of a letter from a Mr. S. F.

Perley, a correspondent of the Massachusetts Ploughman, who dates his letter October 17, 1844. He says: "The rot has prevailed most in ground highly dressed with barn-yard manure, especially if placed in the hill. When potatoes were planted without any manure, they have rotted very little. Two pieces on similar ground, (rather wet,) the one manured from the barn, the other with hair, *lime*, fleshings, &c., from the tannery—both applied in the hill—the first rotted badly, the other very little. Two pieces —the first dressed broadcast, and in the hill, from the barn; the other broadcast, with a compost of barn manure and swamp muck, muck *and ashes*, and clear manure—both dry; the first was planted early, the latter late:—the first rotted in the field; and, being dug in the hot weeks in September, rotted after being put into the cellar; while the latter, dug at odd jobs, from the middle of September to the middle of October, suffered very little. This piece had plaster put on at the time of planting, and after the potatoes were up."

It would appear from the above that the manure which had been applied had been the principal cause of the rot, as "when the potatoes were planted without any manure they had rotted very little."

This is accounted for by the fact that the manure furnished the destroying agent, the infectious carbonic acid. On pages 230 and 231, it is related that a Mr. Minor, of New York, stated to the New York Farmers' Club, at their meeting on November 12, 1844, that Mr. James Hay, of Westchester, had informed him "that his potatoes raised with farm-yard manure this season were diseased, so that he threw away 20 per cent. of them; that on land where he had used concentrated manure, he had good potatoes." Mr. Minor states that this concentrated manure is poudrette, which, you are no doubt aware, contains one or more of the alkalies.

On page 237, Dr. Jackson, in a letter written to the Albany Cultivator, dated September 23, 1844, says: "I learned that where lime had been used in a preparation of about a table-spoonful to a hill, there no disease has appeared;" and on page 244, a Dr. Gardiner is represented to say that "Mr. Anderson has tried lime broadcast; his crop is good." I could refer you to more evidence of this kind, but it might be urged as an objection that these were coincidences—that it merely "*happened*" that where these alkalies were applied the crop "*happened*" to be good; or that the soils were different, or something of that sort. To silence such objections as these, I will now show that in the same field—of the same soil—during the same season—with the same heat—the same droughts—the same wet weather—the same seed—the same exposure to fungi and to insects, (see an article on "*Fungi and Insects*," over the signature of "Chemico," in the October number of the *Farmers' Cabinet*, Philadelphia, Pa.,) with the same culture, and with all other circumstances similar—where the potato crop was supplied with substances containing alkalies, *it was saved from the rot*; and where it was not, *it signally failed*. Before doing so, however, allow me to introduce a few statements going to show the truth of part of the foregoing premises, although they do not sustain all, as some others do that I will, before concluding this article, call your attention to.

The first case I will refer to is that related by the president of the New York Farmers' Club, at the meeting I have before mentioned, which you will find recorded on page 232 of your report. It is as follows: "On our farm last year we tried potatoes where lime had been put the year before, at the rate of sixty bushels to the acre; it was on a part of our garden,

which was also well manured at that time. Another trial was made on a field which had been well manured; sheep had run upon it; *both the field and the garden are old, high, and loamy land.* No lime was put on the field. The potatoes in the garden were planted in April, and dug up in August; *they were perfect.* In the sheep field the potatoes were planted in the last of May or beginning of June, *and we hardly had our seed potatoes restored to us.*"

The next case I will mention is that of Mr. J. S. Netterville, who writes from Palatine bridge, Montgomery county, New Jersey, to the editors of the Boston Cultivator, and whose letter is copied into your last report, page 229, where he says: "This spring, when I began to plant my potatoes, I took about a table-spoonful of slacked lime and put it into each hill; and when they were up, and *before they were hoed*, I made a mixture of eight bushels of leached ashes, two bushels of lime, and three bushels of ground plaster, and stirred them well together. I made a scoop that held about one gill, and I put this full of the mixture on each hill, close to the stalks, and I found, when I began to use them in the summer, *that they were all sound and continued so; and I had not one rotten potato when I took them up in October, although my neighbors on both sides of the farm had scarce any sound ones to get in; so I must think that what I did to my potatoes was the cause of my being so successful.*"

The above is somewhat conclusive, but the following is still more so. On page 264, a Mr. Joseph Walton, writing to the editor of the Albany Cultivator from St. Andrews, New Brunswick, and whose letter is dated November 20, 1844, says: "*Mr. Editor:* I notice in the November number of the Cultivator complaints made about the 'rot' in potatoes. *I was troubled with it for many years, and having found a remedy, give it for the benefit of your readers.* The rot in potatoes in this section of the country commenced about ten years ago; one-third of a crop was frequently lost by it, and often in the spring hundreds of bushels have been thrown from the cellar quite useless. For some years past I have used slacked lime, which I sprinkle on the potatoes as soon as they are cut for seed, and shovel them over in it, and plant them immediately. *Since I have adopted this plan I have not lost a potato, either in the ground or after they were put in the cellar; and such of my neighbors as follow my example are alike fortunate, and in no way troubled with the rot.*"

But the most conclusive experiment, and the one that demonstrates the truth of what I said in my promise (given in this article) beyond all doubt or quibble, is one made by Mr. R. L. Pell, of Pelham farm, Ulster county, New York; a statement which is made in a letter written by him to yourself, dated December 18, 1844, and published on pages 241, 242, and 243, of your last report. In that letter he says: "In the year 1843, I planted a field of several acres in drills, harrowed the ground level, and top-dressed it with 200 bushels of oyster-shell lime and charcoal dust to the acre. The yield was 432 bushels per acre. *At the same time, the potatoes throughout the country were more or less decayed; likewise a parcel of the same seed, planted contiguous to the above, not limed, was also decayed.* This year (1844) I planted the same seed in the following manner: The ground was thrown into drills and manured heavily with barn yard manure. The potatoes were cut into single eyes fourteen days before required for planting, and covered with plaster. Limed a few for the sake of experiments specified. They were sprinkled with small white (almost imperceptible) insects,

and were consequently rejected. Those limed were free. I planted them in the drills on the manure, nine inches apart; tops, centres, and ends separately, to mark the difference in growth, which was very great. The first three drills (300 feet in length) were covered with dry charcoal dust.

"No. 2.	Three drills	covered with	oyster-shell lime.
No. 3.	Do	do	bone-dust.
No. 4.	Do	do	poudrette.
No. 5.	Do	do	unleached ashes.
No. 6.	Do	do	new mown grass and plaster.
No. 7.	Do	do	fine salt.
No. 8.	Do	do	silicate of potash.
No. 9.	Do	do	guano.

"And so on throughout the field, each alternate three drills with a different substance, except six drills, in which the same seed was planted without any composition except the barn-yard manure; and adjoining them six drills, planted with superior French potatoes, received, three weeks before, directly from Havre. The furrows were then all reversed by the plough and the potatoes covered, after which a heavy stick was drawn by a pair of horses across the furrows to level them.

"No. 1.	The potatoes	planted in	the first three drills came up first.
No. 6.	Do	do	with new mown grass and plaster, second.
No. 8.	Do	do	with silicate of potash, third.
No. 9.	Do	do	with guano, fourth.
No. 3.	Do	do	with bone-dust, fifth.
No. 4.	Do	do	with poudrette, sixth.
No. 7.	Do	do	with fine salt, seventh.
No. 5.	Do	do	with unleached ashes, eighth.
No. 2.	Do	do	with oyster-shell lime, ninth.

The 12 drills without composition came up later than any of the rest.

"*Cultivation.*—When they were four inches above ground the earth was ploughed from them. After an interval of six days it was ploughed to them again; the field being in perfect order, required no other attention during the season. On the 3d of October they were ploughed out, and *proved to be perfectly sound, with the exception of the twelve drills of pink-eyed kidneys, and French potatoes, without composition, which were entirely rotten.* 600 bushels were pitted immediately, and not examined before the 5th of December, when they were found to be perfectly sound."

It is known to yourself, that in guano, silicate of potash, salt, plaster, unleached ashes, poudrette, bone dust, and oyster-shell lime, there are alkalies. In some of these substances there are several of them—in others but a few. The charcoal dust, mentioned as having been used successfully in Mr. Pell's experiment, *prevented the potato rot by virtue of its well known powers of absorbing carbonic acid, and thus preventing the potatoes from absorbing it to their injury.*

Thus we see that the theory I advance, besides being reasonable and based on a knowledge of the chemical nature of the plant, is proved by numerous and definite experiments that are well attested, so that but little doubt can exist of its truth.

If, then, this be the case—and it appears to me no reasonable man can doubt it—how easy is the cure of the disease of the potato effected! No

need of the trouble and expense of sending to South America, or any where else, for a new stock; no need of raising potatoes from the balls for the purpose of getting a more hardy variety, or one more capable of resisting the disease; no need of sustaining great losses from the rot; no need of planting out of season; no need of fearing the effects of the fungi; no need of dreading the attacks of insects; no need of giving up the raising of potatoes on account of the unprofitableness of the crop, when that unprofitableness results from the failure of it on account of the rot; no need of gloomy fears of starvation, and all its accompanying evils; no need, I say, of all these. All that will be necessary is, for each potato raiser to gather a few stones from off his farm and make him a snug little ash-house, that will not be liable to take fire, and that will keep out the wet, and then let him require his family to put all their ashes in *there;* and when he plants his potatoes, put those ashes on them, and manure them with rotten straw, hay, sawdust, or swamp muck, and not with stable or animal manure. And if he finds in the fall, or the latter part of summer, that he has not put enough on—that, in consequence, his potatoes are diseased—let him lose no time, but take a bag full of the best ashes he has, and, throwing it on his shoulder, go over his potato patch and sow it on them till they look light with the dust; it is better that this should be done in the morning before the dew is off, or during a slight shower, but any time is better than neglecting it altogether. By so doing, his crop will be large, and the potatoes will be healthy and in nowise affected with the rot.

If you desire other information on this subject, see several communications, over the signature of "*Chemico,*" in the May, June, and October numbers of the "*Farmers' Cabinet,*" an agricultural journal published at Philadelphia, in this State. The communications are severally headed "Disease of the potato;" "Potato rot;" "Fungi, insects, &c.—how to prevent their attacks on plants."

Wishing you health and prosperity for your many and well-directed efforts for the advancement of science, and particularly in agriculture, and your labors in the cause of home industry, permit me to subscribe myself yours, with the most ardent desire for the advancement of mankind in knowledge and happiness,

THOS. CROFT.

Hon. H. L. Ellsworth.

From the Albany Cultivator.

DISEASE IN POTATOES.

From several sections we hear there are already symptoms of this disease. B. P. Johnson, esq., of Rome, writes us, July 18th—

"I have examined, within the last few days, a number of fields, and find indications of the disease in almost every field. The upper leaves first show indications of the disease—the leaves shrivel or curl up, and it soon extends to the entire stalk. In some instances, when the potatoes have been dug, on cutting them open a small black spot is found in the centre. In others the potato appears sound and healthy.

"The disease is not confined, so far as my observations extend, to any particular variety of potato, or to any special location. Seed procured from

the west, where no defect was apparent last year, suffers equally with seed selected from the crop raised in this section last year. I planted some this year, and made a preparation of salt, plaster, and house ashes, of nearly equal quantities, though of ashes the most, and put about a handful in each hill before covering. The vines look remarkably well, and as yet are free from the curl in the leaves. Whether they will escape, a few days will determine.

"I am led to believe that this disease is somewhat analogous to smut in wheat. As it has made its appearance so early in the season, I hope careful observations will be made, in order, if possible, to aim at some definite conclusions in relation to the cause of the disease and remedy."

Dr. Camp, of Windham, Greene county, has sent us a couple of insects, of a kind which he thinks causes the rot in potatoes. He states that the blight which precedes the rot has already attacked the crop, and that on all the affected stalks he finds more or less of these insects. The healthy vines, he states, have no insects on them.

For the Boston Cultivator.

ROT IN POTATOES.

Messrs. Editors: The common disease of last year has again made its appearance among the potatoes in this section of the country; to what extent the malady is prevailing, is not exactly known. Now, I am inclined to believe that the disease is chiefly caused by the atmosphere operating upon the stalk in such a manner as to obstruct its natural circulation of sap, which prevents the regular exhalations of the plant, and deranges nature's perfect operations by preventing the escape of the excess of ammonia which accumulates in the hill, and is held there in a state of unnatural confinement by the disease of the stalk and the crust which forms upon the surface of the ground, which makes the hill nearly air-tight. Then, the ammonia in the hill engenders disease, which usually, under these circumstances, makes its appearance in the form of a blister upon the skin, and soon makes progress towards the heart or middle of the potato, forming, as the disease progresses, a kind of fungus upon the surface of the tuber.

In other cases the ground appears to crack near the root of the vine, so that the ammonia escapes so rapid that the vine is killed at once; in which case, it is not uncommon to trace the disease directly down from the stalk, in black streaks, to the middle of the tuber.

The reasons which have led me to the foregoing conclusions are many and various; a few only of which will be here suggested, with the hope that others more close in observation, and more philosophical in thought, will show my mistake (if I am in error) by tracing out the true cause of the malady, and prescribe a remedy. In the first place, then, my own observations, corroborated by the testimony of hundreds of others, show very clearly that when the land is manured with that kind of manure that is highly charged with ammonia, the malady is most fatal. 2d. Where the same land, side by side, is manured with manure so rotted as to have lost all its smell, very little disease is found. 3d. The hardiest varieties of potatoes are not as liable to the disease as those which are more tender and feeble. 4th. That kind of compost possessing no smell of ammonia will

invigorate the stalk and elude the disease: for instance, proudrette, salt, lime, house ashes, plaster, &c. It is believed that an entire revolution in the mode of cultivation must take place, before the farmer will be as certain of success as formerly. Manure that is in a state of fermentation when applied to the potato hill, or manure that will ferment so as to exhale ammonia to any considerable extent during the growth of the plant, will be likely to engender disease, unless some compost or other substance is used, which will so strengthen and invigorate the stalk as to enable it to elaborate the sap, and convey back from the air to the root those nutritive elements so necessary to the hill, in order to preserve the health of the family of tubers contained therein.

Unless some substitute is used for manure that will not promote ammonia in the hill, what must the cultivator expect? Disease or disappointment; or he must select poor land for raising his potatoes, and be content with small crops. We suffered greatly by the malady last year, and at that time had no precious experience in the matter. This season we have taken a different course in the preparation of our potato lands. Instead of using any manure, we selected land that was highly dunged last year from the sheep pens and cattle stables, and was in corn. Ploughed twice, as usual, aad planted early in May, three feet apart both ways; we cut the potatoes, and used as much lime as would stick without water. As soon as the plants were out of the ground sufficiently to live, we made a compost of salt, unleached ashes, lime, and plaster; incorporated the whole together, and top-dressed every hill with a table-spoonful of the compost, and covered it in the hill at hoeing—hoed twice. After the potatoes had gone out of blossom and the hot weather set in, in July we sowed broadcast over the field two bushels of salt to the acre. These potatoes have been in eating three or four weeks, and not a diseased potato can be found in the whole field.

Respectfully yours,

J. M. WEEKS.

Salisbury, Vt., *September* 1, 1845.

From the Kennebec Journal.

CROPS AND WEATHER.

The potato rot, which, for two or three years, has been so destructive in the middle States, and last year in Massachusetts, and to some extent in New Hampshire and Maine, appears to spread this year over all New England, Nova Scotia, and New Brunswick. Some few locations may escape with little damage, but the destruction is very widely spread. In Somerset and Franklin thousands of acres have been planted in potatoes for the starch factories.

For the Boston Cultivator.

THE POTATO CROP IN MAINE.

Messrs. Editors: From what can be learned, this staple article, in this State, will, in consequence of the rot, fall short one-half or two thirds of a usual yield.

It will be a severe calamity to us, and to citizens of other States who have their supply of this useful and necessary article of food from this State.

In 1844 the farmers of this State raised 12,304,000 bushels of potatoes, and no State in the Union exceeded her in the business, excepting the great State of New York with her three millions of inhabitants. She raised 17,703,000 bushels—about six bushels to every person in the State; whilst Maine averaged about twenty-four bushels to every person in the State.

If we base our calculations upon last year's yield in Maine, the loss in consequence of the rot cannot be less than $1,230,400; more than two dollars to every person in the State.

The rot prevails generally throughout the State; last year it prevailed in some sections only. It then seized the potatoes about the last of August. It will be remembered that we had in this section of the State very warm weather, with frequent though not heavy rains, about that time, and it invariably cleared off very warm, when formerly it generally came off cooler immediately after rains.

This season has been the warmest for many years. The rains in this section commenced one month earlier than last year—say the last of July and first of August; consequently the most of potatoes, exceping those planted very early, and of an early kind, were young and tender when these rains commenced. The soil being heated by many days and *nights* of sultry weather, actually scalded them, and but few, if any, escaped, excepting early planted, and not even these when planted on unfermented manure.

It will be remembered that though we had frequent rains, they were not heavy ones—barely enough to wet the manure in the hill; which doubtless caused them to rot more rapidly than if the rains had wet down deeper. It will be remembered, also, that the sun came out very hot after these rains, killing the vines of the potato, whilst the heat and wet under the surface were doing their work of destruction to the young and tender tuber. The first appearance of the rot is dirty, yellowish spots, similar in appearance to iron rust; it penetrates the potato, and in a short time turns to a dark color, and the work of destruction is soon finished. They appear to smell and taste similar to a frost-bitten potato.

The State of Massachusetts will probably be exempt from this potato disease, if disease it may be called, as she was not visited by rains about the time it was so extremely hot; but her crop of potatoes must necessarily be light.

GEO. M. FREEMAN.

YORK, ME., *September* 25, 1845.

Editorial remarks.—The rot in the potato has prevailed in this State to a very small extent, compared to its effects in Maine and on the sea-coast of New Hampshire, where in many cases no more than a tenth part of a usual crop will be obtained. In some sections in this State the rot has not prevailed at all this year; yet owing to hot, dry weather, the crop is very light and the quality poor. Col. Sheldon, of Wilmington, informs us that he usually gets about 200 bushels of potatoes to the acre; that this season he had only about 700 bushels on 14 acres. Potatoes in general are of a poor quality this year. They are brought into this market from different States,

and from Nova Scotia and New Brunswick, and they are most all poor—watery, heavy, and of poor flavor.

From the Newark Daily Advertiser.

THE POTATO ROT IN NEW JERSEY.

We learn by the Burlington Gazette that Nathan Stowell, of that place, has been directing his attention for four years past to the subject of rot in the potato, in hopes of discovering the cause of a disease which begins to threaten very serious consequences. Mr. Stowell thinks the rot is owing to the sound seed having all run out, and that too little new seed has been produced. He has himself produced a fine crop of new potatoes from tubers of the Foxite variety, and out of nearly fifty bushels not a single potato is diseased. The vines were free from blight. A patch of Mercers, close by, were grievously afflicted with the rot.

From the Saturday Courier.

THE POTATO DISEASE.

Messrs. M'Maken & Holden:

As much has been said and written of the disease of the potato, I will here briefly state my own plan and opinion in regard to raising them the past season. I planted them as soon as the ground would admit of it—manured them in the hill, with well rotted manure. In planting, I selected the largest, and was careful not to get any but those that were perfectly sound; kept the ground free from weeds till autumn, and dug them about the middle of October, although the tops were dead a month sooner. I thought it best to let them remain, and I can truly say that my expectations were more than realized, inasmuch as I had about 300 bushels to the acre, and have not seen one potato rotten, or in the least affected. At the same time my neighbors complain of their potatoes rotting, and many have had to carry them from their cellars.

Yours, &c.,

D. S. SANDERSON.

CHESTERFIELD, N. H., *November* 17, 1845.

ANOTHER CAUSE FOR THE POTATO ROT PROPOSED.

To the Editor of the Maine Farmer:

DEAR SIR: Please to inform your readers that, in my opinion, the failure of the potato crop by rot and rust is caused by cutting the seed. I think the whole trouble may be safely attributed to the unfortunate use of the knife among the seed designed for planting. I do earnestly entreat my agricultural friends to pause and take into consideration this hint before they complete the destruction of that valuable root. That beautiful skin

which God has put over the potato should not be cut, nor in any way wounded, if a perfect crop is wanted.

The reasons, if reasons are wanted to establish a self-evident fact, together with the remedy, can be made the subject of another communication, if desired. B. SHAW.

OLDTOWN, *September* 11, 1845.

Note.—We publish friend Shaw's remarks on the potato rot, although we cannot agree with him. If cutting potatoes caused the rot, why have we not been troubled with the disease years ago? The custom of cutting potatoes is old, while the rot is new.—EDITOR.

POTATO ROT.

To the Editor of the New England Farmer:

I observe in European newspapers, recently arrived, that the French Academy of Arts and Sciences deputed Mr. Charles Morren, of Liege, to examine into the cause of the potato rot. That the French should have selected a foreigner for this purpose, says more for the high esteem in which his talents are held, than anything which can emanate from me.

This gentleman has stated the result of his investigation to be, that the rot is caused by a *fungus*, the spores or seeds of which exist in vast quantities in the atmosphere; and this opinion has been generally received as true by the best informed circles in Europe. I have not seen the paper by Professor Morren, and therefore do not know whether he suggests any remedy or not. You well remember that the result of my observations on this disease, published in your paper last year, perfectly accords with that of Professor Morren, and that the remedy I proposed—of *salt*—was founded on the power of this substance to dissolve and destroy most of the fungus family; hence, where there was salt, the spores could not vegetate. I also regretted (and much more regret now, as the disease has caused such extensive devastation) that I did not possess a microscope of sufficient perfection to enable me to pursue my examinations both into the disease and its remedy; the want of this alone made me drop all further investigations on the subject. But previous to this, I repeated and considerably extended my experiments with various chemical salts, and drew up a paper of several closely written pages, containing the details, with all my views on the subject; which paper, by request, I sent to the New York State Agricultural Society, last December. Of this communication, as well as of one accompanied by eight or nine samples of various qualities of guano, with the analysis of each, they did me the honor *not to take the slightest notice.* I am very sorry that I did not keep a copy of this paper, which, of course, is now amongst things lost or forgotten.

I have no doubt that this disease is completely under the dominion of science, and that a perfect remedy for it exists.

Yours, truly, J. E. TESCHEMACHER.

BOSTON, *October* 4, 1845.

From the New England Farmer.

THE POTATO DISEASE—SALT AS A REMEDY.

Mr. Joseph Breck: I think the public must have reason to be satisfied with the indefatigable spirit you evince in collecting information on the subject of the potato rot, which is more universal in this country than most people think. I hear, every day, of instances of parcels stored in cellars, apparently sound when put in, which are now totally worthless. Depend upon it, unless some remedy be found, it will hardly be worth while to plant potatoes another year.

In order that I may not be misunderstood, I will now succinctly state my opinions on this subject.

I think that salt, lime, and several chemical compounds, will destroy the disease. I prefer salt, because, when mixed in the soil, it may get into the juices, and circulate through the whole plant. Lime, or lime-water, would do the same, to a certain extent, but it is far less soluble than salt.

The fungus I have seen vegetates upon and thickens the sides of the cells of which the potato is composed, which cells contain the grains of starch. The starch is not injured until the sides of the cells rotted by the fungus burst; the worms or maggots breed, and the whole finally becomes a mass of putridity, with an offensive, fungus-like smell.

I saw in your last week's paper several cases of the disease occurring where sea-weed has been used, and also near the sea shore. These cases would seem to militate against the idea of salt being a cure. But they are very far from convincing me, for the following reasons: the salt atmosphere near the sea may not have contained one-tenth enough salt to destroy the rot, or the prevailing winds there may not have spread the spray in sufficient quantity. And with respect to sea-weed: in a late London journal there are analyses of four different kinds of sea-weed, performed by burning the weed and analyzing the ashes.

			Ashes.	Salt.
Laminaria saccharina	gave to 100 lbs. about	-	10 lbs.	3 lbs.
Fucus vesiculosus	" 100 " "	-	20½ "	6½ "
Fucus serratus	" 100 " "	-	26 "	10 "
Fucus crispus, or Chondria crispa	" 100 " "	-	25½ "	4¾ "

They varied also considerably in the other ingredients. Now, when this great difference exists in the quantity of salt in different sea-weeds just taken from the sea, and when it is considered that the sea weed is often made into a compost, turned over and exposed to all kinds of weather, by which salt may be washed out, it must be obvious that no true judgment can be formed of its effects on the potato disease, unless the kind of sea-weed, and all the attendant circumstances, be taken into account. The spores of the fungus, in the cases alluded to, might have been, and most probably were, so numerous, that the salt thus adventitiously obtained was not sufficient to destroy them.

In a paper transmitted to the New York State Agricultural Society, (alluded to in a former communication,) I recommended an analysis of sound potatoes, and a parallel one of those just contaminated by the rot; and this to be done not in the usual way, by reducing to ashes, but by expressing the juices and analyzing *them*. This would show whether there was any difference in the ingredients that might be considered as offering favorable circumstances for fungus vegetation. The analysis by incineration should

also be tried; for, if salt destroys the fungus, as my own eyes as well as those of others have seen, it is a fair presumption that if we can get a solution of salt into the juices of the plant, in any shape, it will be unfavorable to the vegetation of the spores.

Until I see a number of experiments fairly tried with salt, lime, &c., and *they have failed*, I shall not be persuaded that the views I have taken of these, as remedies for the potato evil, are erroneous; and should they prove of no value, I am quite ready to give them up and *try again*.

Yours, truly, J. E. TESCHEMACHER.

BOSTON, *November* 15, 1845.

In our next, we shall, by request, give a translation of the opinions of M. Morren, Professor of Agriculture in the University of Liege, Brussels, whose investigations have led him to believe, with Mr. Teschemacher, that fungus is the cause of the potato evil—an opinion which is now attracting more attention from the intelligent classes in Europe, than any other yet advanced concerning the origin of the rot or murrain.—EDITOR.

[For Prof. Morren's, see appendix No. 6.]

BOSTON, *December* 8, 1845.

DEAR SIR: The steamer Cambria, just arrived, has put us in possession of the report to the British government by Professors Kane, Playfair, and Lindley, on the potato disease. We have now the reports, on this subject, of scientific men in three European countries: Professor Kutzing, in Germany, Professor Ch. Morren, in Belgium and France, and the above report in Great Britain. Having interested myself in this disease, by about three months' study last autumn, I have read these with some attention; and thinking a short review of them may lead to some useful conclusions, I address you according to promise—premising, however, that I shall leave nearly untouched the subject of saving potatoes for this year's consumption, or the more intricate process of starch making.

All these reports appear to coincide in the opinion, that a minute fungus is the first *visible* cause of the disease; that this fungus spreads rapidly through the tuber by means of its spawn, *mycelium*, or spores, causing rottenness. Professor Morren states that he has traced it from the leaf, where it commences, downwards, causing thereby the death of the haulm, from which it finally enters the potato. This is also my opinion, published in 1844. I had traced it through the place where the stem joins the tuber, not having commenced my investigation with the green haulm. But I had also seen it pass through the skin of the tuber, and work its way to the centre and all around. The British professors, doubting whether this fungus is the true cause of the disease, state, "that it seems to be connected with the cold, cloudy, ungenial weather which has characterized the present year over the north of Europe; conditions highly unsuited to the constitution of a plant which, like the potato, is a native of a warm sunny country, and insufficient for the ripening of the tubers.

But quite decisive objections to this view are—

First. That we have had a warm, dry summer on this side of the Atlantic, with more than a usual proportion of sunshine, and yet the disease has spread with equal fatality here; and,

Second. That they have had many such cloudy, wet, and cold summers

before in Europe, without the appearance of this peculiar disease in the potato.

It is clear, therefore, that this so called atmospheric influence is merely a name, without a distinct tangible meaning, and the evil of accounting for the disease by a mere name, such as an epidemic or atmospheric influence, is to stop all further inquiry and investigation, either into cause or remedy; for if the *nature* of the cause be not known, the attempts at remedy are mere guesses. If the seed of the fungi were not there, the atmospheric influence could not cause them to vegetate; and if, knowing the nature of this fungi, we can destroy them or prevent them from vegetating, there is an end of the disease. Again: that the disease has increased immensely since 1844 gives a very strong natural presumption that it arises from the rapid and more widely diffused propagation of a vegetable fungus, whose seed, (spores,) according to Professor Morren, are quickly generated in inconceivable numbers.

The British professors practically feel, however, that the disease is caused by this fungus, for they recommend "that potatoes should not be planted in the same soil from which the diseased ones are taken this year, as it is in all probability filled with the seeds of fungi, in countless myriads, which must have been scattered over the tainted fields, and, although they have been probably borne by the winds to every part of the country, are in great profusion there."

They must therefore clearly think that the spores of the fungi will again attack the potato. Any one with a good microscope can clearly trace the propagation of this fungus inside the sound potato, from cell to cell. It is on the sides (walls) of the cell that it vegetates; but they cannot trace any previous rottenness in the cells, although the juices therein may be favorable to this fungus propagation. A careful analysis of these juices, compared with those of perfectly sound potatoes, might throw light upon this subject. The increase and propagation of other vegetables as well as fungi, under peculiar and favorable circumstances, on which science has as yet but little knowledge, is not uncommon. A few years since, about 1½ mile square of salt marsh in East Boston, close to my residence, was one season entirely and thickly covered with *gnaphalium polycephalum*, scenting all around with its peculiar odor, where, for years previously, only a few spikes had been known, and to which state the spot has now reverted. It would be difficult to find a hundred spikes, where, that year, there were millions.

That there are peculiar circumstances which favor the rapid propagation of particular fungi is certain, and equally certain that there must also be circumstances unfavorable to it, and it is to the study and production of these unfavorable circumstances that we have to look for remedies.

A careful perusal of these reports will, I think, satisfy any one that a minute fungus, propagating profusely under favorable circumstances, is the cause of the disease; and that salt, lime, and various chemical salts, will probably if not certainly prove the most effectual remedies; and this is precisely the opinion I formed after about three months' investigation, during the autumn of 1844, and which I embodied in a paper I then sent to the New York State Agricultural Society.

Respecting these remedies, Professor C. Morren (no mean authority on these subjects) states that salt, lime, and bluestone, (sulphate of copper,) strewed over the land, will destroy the disease; but he does not give, or I have not seen, the experiments by which he substantiates this fact. I found

that these remedies destroyed the *mycelium*, and all other propagated parts of the fungus, except the spores; but if they are destructive to the vegetation, where they are found the spores cannot vegetate. My object in recommending the application of salt to the soil, was, that it might be taken up in a liquid state by the roots, and circulate throughout, thus preventing the beginning of the disease, which Professor Morren states to originate with the vegetation of the fungus spores in the leaf. The British professors, in their first report, decry the use of salt to the potato when dug up, as accelerating the progress of the disease; but in their last report they recommend strongly to steep the sets, previous to planting, in a solution of salt and bluestone. The truth as respects the application to potatoes dug is, probably, that if the disease is already under the skin, the salt cannot penetrate, and then, unless the brine were very strong, the moisture of the solution may accelerate the progress; but I do not believe that an entirely untainted potato, if covered with a strong briny solution, will ever receive the disease.

The instances where salt has been used in the soil, and the potatoes have escaped, are not unfrequent; after numerous inquiries, I have heard but one solitary exception; where six bushels to the acre had been *harrowed* in, the potatoes had the rot the same as those without salt.

I admit that this alone would be fatal to the virtue of the remedy, were it not for one circumstance. I found, on inquiry, that the soil was the stiffest and most unyielding clay. Into this water cannot freely penetrate, much less water thickened with salt; the experiment, therefore, does not prove the use of salt, for in every probability it was washed from the surface, or never penetrated to the roots of the potato. I have not the slightest objection to surrender my opinion, when it is found not just.

There are several instances in which the application of chlorine gas has clearly destroyed the disease; but this application is impossible on a large scale, and is, besides, liable to very dangerous and fatal accidents; but salt is a mixture of chlorine and soda.

Unslacked lime will also destroy this fungus, and must therefore be a most excellent addition to the soil with salt; but lime is not so easily caused to circulate in the juices, except as lime water, and then the acids in the plant would quickly saturate it and change its nature; in addition to which, it soon attracts carbonic acid from the atmosphere, and becomes carbonate of lime, in which state its powers on fungi are very questionable.

The most important object is now to provide for the next year's crop—both potatoes to plant and soil in such a state as to offer the fairest hopes of obtaining it free from this dreadful disease; for if it occur the ensuing season with the virulence of the present, we may bid adieu to the potato; nay, for aught we know, it may attack some other vegetable of equal importance.

I have studied and reflected much on the subject; the result is the following recommendation:

Let the potatoes intended to be planted be selected with the greatest care, with the fairest and cleanest skins, rejecting all such as have small, dark, soft pustulous looking spots, which are often not larger than the head of a pin; powder them over very liberally with fresh quick lime, and keep them as warm and as dry as possible; it is indispensable, however, that the warmth be a dry heat.

The spot for planting should be a good loamy virgin soil, or a spot that

has not been broken up for years, and as dry and well drained as can be had. Do not use any manure; put in guano if so minded, as it is not possible that the seed of the fungus can exist in it, whereas manure may be a fertile source of them.

Just before planting, plough both lime and salt into the land, then steep the tubers in a strong solution of brine, to which a little bluestone (sulphate of copper) may be added, and commit them to the soil. I have not said anything respecting quantity; this must depend on the soil.

An addition to the report of the British professors gives a favorable opinion of peat, bog ashes, and the water from peat bogs. I notice this, to warn the farmer that the bogs here do not quite resemble those in Ireland, and, in my opinion, would not be equally efficacious, for reasons which would be too long to detail; but their idea appears to me to be well founded, and worth extensive trial with the English and Irish peat, in which all kinds of vegetable and even animal substances have been found in a perfect state of preservation, although they have lain there imbedded for centuries.

Yours, most respectfully,

J. E. TESCHEMACHER.

Edmund Burke, Esq., *Washington.*

New York, *November* 17, 1845.

Dear Sir: I promised you the result of some experiments which I made on some diseased potatoes, and it is as follows:

I selected a quantity of these roots from a lot which had been rejected as unfit for use. They all were affected. I divided them into three parcels. The first I subjected, for twelve hours, to a weak solution of chloride of lime in water. The second was, in like manner, subjected to the action of a saturated solution of recently burnt lime in water. The third lot was freely sprinkled over with recently burnt lime-water, slacked to dryness.

The two first lots were, after being so treated, placed on a brick pavement under cover, and the third lot was suffered to remain partially covered with dry caustic lime, and all of them so suffered to remain for six weeks; when they were examined, and the disease found to have been wholly arrested.

The potatoes, however, in the first and last lots, had somewhat shrunk, owing probably to the too caustic treatment which they had received; but the second lot, or that which had been steeped twelve hours in lime water, were plump and good; and, when boiled, the diseased portions or blotches came off with the rind. The parcel from which I took the potatoes on which I experimented continued to perish, and were finally thrown away as worthless.

Exposure to the atmosphere in a dry place may have had a beneficial effect; but the disease is, beyond a doubt, occasioned by *fungi* of a very delicate texture, which were destroyed or decomposed by the acrid substances to which they were exposed. If mistaken in the character of the disease, and it should ultimately be found to result from the depredations of animalculæ, the cure may be ascribed to the same cause.

The results of my experiments induce me to believe that the absence of a sufficient quantity of lime-stone (carbonate or phosphate of lime) in soils is the cause of the disease in the potato. If it be owing to other cause or

causes, the remedy indicated, it seems to me, is the free use of lime, water-slacked to dryness, or of unleached ashes at the planting or first dressing season of the potato; and I suggest to farmers, who have suffered from this widespread pestilence in their crops, to try whether a judicious use of these materials may not prove a corrective for, or preventive of, this disease.

With great respect, your friend and obedient servant,

EDWARD CLARK.

Hon. EDMUND BURKE,
Commissioner of Patents.

CALAIS, ME., *January*, 1846.

SIR: The potato disease prevailed the past year in the whole State of Maine, in the Province of New Brunswick, and to some extent in Nova Scotia. In the eastern part of Maine, where there was no disease the year before, it was the most destructive the past year.

I cannot give you its cause, nor a remedy; but will give some incidents relative to its character:

Some of my seed potatoes I cut, and put lime in the hill with them when planted.

Some I planted whole, with lime.

Some cut and some whole ones, without lime.

Some seed I procured from a distance, and which was grown upon a different soil entirely.

In some of my compost manure I used a large quantity of potash.

In all these cases the disease upon the potato was apparently the same; nor did the quantity or quality of the yield vary. The greatest difference was found in potatoes planted upon different soils. On that soil which was stimulated most by manure, (and especially by manure in the hill,) the "rot" was the greatest. On dry loamy soil the disease did not affect the potato so much. On wet land, and especially on wet clay land, the disease was most fatal. It was observed, that where lumps of clay lay so near to the new grown potato as to touch it, the potato would be rotten on that side touched by the clay. The potatoes which grew nearest the surface, and nearest the stalk, were also observed to be most rotten. Those soils on which the salt rock-weed was used as a manure in great abundance, and where the influence of the salt-water fogs was felt, were equally if not worse affected by the disease.

One experiment I made, the result of which I think important. As the potatoes were dug, a part of them were put into barns, and a part were put in heaps of fifty bushels each, on a dry part of the field, and covered, first with straw and then with dirt, four or six inches deep. I left them here as long as it was safe, on account of the frost. We found, in taking those from the barns to the cellar late in the fall, many of them had rotted, and others looked sickly. But those we took from the heaps in the field to the cellar (being the latest removed) were as bright and sound as when dug, except a few which had entirely rotted, and which we supposed had commenced rotting before put into the heap.

I am, sir, respectfully, your obedient servant,

GEO. M. CHASE.

Hon. EDMUND BURKE,
Commissioner of Patents.

ARE THEY ALL MISTAKEN?—POTATO ROT.

To the Editor of the Maine Farmer :

Dear Sir : As one of the many who are particularly interested in the potato malady, I have watched narrowly the thousand and one plausible and *unplausible* conjectures about the cause of the potato disease, so universally prevalent in the potato kingdom of all Up East. I find as great a diversity of opinion upon this subject as there generally is on all others that call forth the expression of the multitude.

The potato rot will seriously affect the *deposites* of thousands in our State ; but let us bear in mind that all the *rottenness* in the body politic is not confined to the potato tribe.

That the potato rot is caused by the drought, or moisture, cold or heat of this or the past year, or that it is caused by cutting the seed, or by an insect wounding the tops, or the premature killing of the potatoes by mildew, rust, or frost, I cannot believe ; and I will give you the reason. Last spring, the thought struck me that potatoes would, if left in a cellar through the summer, produce new potatoes ; and accordingly, to try the experiment, I laid a few (say half a bushel) on some dry tan bark, in a dark dry place in my cellar. Yesterday I took some of them out, and on examining them I find quite a number of new potatoes, from the size of a hen's egg down to a mite, as you will see by the examples I send you ; and on examining the new potatoes, I find among and upon some of them precisely the same appearances of the disease and rot, that I did in diseased and rotten potatoes in the field in its first stages. Of course you will bear in mind that the disease on those I send you must be in its first stage.

Now, Mr. Editor, by this you will see, that if the disease in the potatoes that I send you is the same as that confined to those grown in the open air, it is all folly to talk about rust, the heat, cutting the seed, &c., for none of these, I presume, caused the rot among those grown in my cellar.

My opinion is, that the cause is in the potato, and in the potato alone. It is universally the case with us, that the richer the soil is in which potatoes are grown, the more and faster do they rot when in the ground.

You may hear from me again upon this subject, but my engagements at this time will not allow of more at present.

Truly yours,

E. G. BUXTON.

North Yarmouth Centre, *October* 9, 1845.

Note.—We have examined the potatoes which friend Buxton has sent us, and can see no difference at all in the disease that affects them from the disease in the fields. They can be seen at our office.—Editor.

For the Boston Cultivator.

THE POTATO DISEASE.

Messrs. Editors : Much has been said and written on the rot in potatoes. With your permission, without pretending to solve the question, I will make a few remarks upon the subject, which may or may not cast some light upon the cause and remedy. Perhaps no subject has perplexed and

baffled every one more than this. Some have supposed it to be the electrical influence upon the tops. Others have held it to be something peculiar in the soil.

I am inclined to suppose that the leading cause is in the soil. If so, the remedy must there be sought. From all that I can gather from what I have seen and heard, it appears to me that it is mostly from mismanagement in the husbandry; the air and electricity have probably much to do in the case. As far as I can learn from inquiry, I am satisfied that the potatoes rot most where they come most in contact with manure, especially sea-dressing.

The immediate cause of rot is probably a blight of some kind—rust, or some other—on the tops. This more or less diseases the stalk, root, and tuber. In proportion to the violence of this blight, the rot probably progresses. Manure coming in immediate contact with the growing crop, by being put in the hill or spread upon the ground, forces the growth, especially of tops, too fast. This renders the substance of the tops too loose and too much inclined to fungus matter. Therefore, whenever a sudden change has come, from a hot day to a cold night, and then to a hot sun again, the tops have not had stamina of constitution sufficient to stand and withstand this change. The consequence has been diseased tops, which, in the end, has diseased the whole system. I am disposed also to think that the latent cause is a good deal in not ploughing the land sufficiently deep.

I am apprehensive that manuring on the top of the ground and in the hill induces too much growth in the early part of the season; the roots, which seek moisture, coming in contact with the hard ground below the ploughed stratum, are resisted in their progress, and become unable to supply the plant with sufficient moisture from the earth. In the mean time, the roots which were near the surface to collect the solar influences for the plant, and the leaves of the plant which collect from the atmosphere having their full operation, supply more of their relative proportion of matter toward the general growth, than the descending roots can—an overstock comes to the plant, and produces disease.

The natural inquiry here comes, what can be the remedy? I candidly confess I do not know; but I will suggest my opinion. I am inclined to think that potatoes would do better, all things considered, without any manure in the land. But should manure be applied, let it be ploughed in to the depth of 15 or 16 inches—more if possible. The depth of earth would be sufficient for the descending roots to gather moisture through the season, to act in concert with other roots and the leaves, thereby preserving a healthy state of the plant. This disease, whatever it is, comes from an over-action in some part of the plant, and a minor action in some other part. And it is very evident that the roots cannot penetrate the hard unbroken ground below the ploughed stratum, to obtain moisture. It is very evident, too, that no plant can grow and be healthy when deprived of proper moisture.

I would also suggest one other thing concerning the cultivation of potatoes—the planting in drills. After ploughing the land as deep as possible, just make a mark (not a furrow) for the rows; then, after dropping the seed, turn back furrows upon the seed, putting on all the earth that the future crop will require. Afterwards, to subdue the weeds, run a light fine harrow over the gound, as often as necessary. Then the crop will all set at once, and all will be sizeable; having no small, worthless potatoes. It is well

known that by adding earth about the tops of potatoes sets a new crop every time that the addition is made. It is also well known, I believe, that these successive crops are of very little, if any, value to the owner.

My notion about the growth of vegetables from the three causes—the united effects of the watery roots, the solar roots, and the leaves—may or may not be novel to others; but I am strongly persuaded that these three are the main causes of growth, health, and disease in all vegetables. Other causes undoubtedly operate, to wit: the electrical; but these are so subtle and fine, that we cannot go much into a definition of them. We can do but little more than talk about them; but whatever agency and effect electricity may have—and it is undoubtedly very great—I am inclined to suppose that that agency depends very much upon the due and proper management of the three causes which I have noticed above.

I will say one word more upon the subject, and close. So far as I can learn, the long red potato does not rot so bad as the other kinds. If this is true, that variety should be sought and planted the next season, in preference to any other. It is also undoubtedly the richest and most productive of any kind that we have. The potato crop is now almost the standard of life on the face of the earth, and no labor, research, nor investigation should be spared to prevent it, and protect it from loss. So far as we know now, we have no substitute for it.

PHILO.

PORTLAND, *October*, 1845.

THE POTATO DISEASE.

To the Editor of the Bangor Whig and Courier:

With your permission, I propose to review some of the opinions put forth and entertained on the subject of the death and rot of the potato.

And, first, of disease. Very learned professors have asserted, and continue to repeat, that the potato is diseased—dying out; and most persons believe it; and the question is often asked, what shall be substituted for the potato? The sudden death of the potato top, and the subsequent rotting of the tubers, are said to result from disease in the seed planted. But what are the facts offered to demonstrate the soundness of this theory? Simply that the tops die, and the tubers rot. And what does this prove? Nothing. On the other hand, the potato tops the present season were seldom if ever more thrifty, or gave greater promise of an abundant yield. Up to the hour of their death, the potato tops of every variety, to all appearance, were never more healthy or vigorous. If this fact affords any evidence of decay in the plant, the advocates of disease may have all the benefit to be derived from it.

It is said by others that the potato top is killed by a worm eating into the stalk near the ground, and making his abode there. This is true every year to a greater or less extent; but the effect is, not to rust or rot the stalk, but it merely dries up, as it would do if cut off. Plants killed by the potato worm emit no unpleasant smell; and, therefore, the rust of the present season is not caused by a worm.

Others, again, assert that it is a little black bug that has killed the potato tops. I have examined a number of fields with particular reference to this

bug. This bug is about the size, skips as nimbly, and will jump as many times his length, as a flea; and, as near as I am able to estimate, would number about as many to a hill of potatoes as there are fleas in a well instructed family of flea catchers. So much for the "little black bug." Now to the remedy. Doctor Jackson says: "I learn that where lime has been used in the proportion of about a table spoonful to a hill, there no disease has appeared." In the same paper he asserts: "No peculiarities of soil or of manures appear to afford any explanation, for the plant appears to have been affected in one as much as the other." This last is true. But how is the common farmer to be instructed by the above statements? Dr. Jackson is a strong advocate for the use of lime as a manure; and, by putting about a table-spoonful in a hill, does the lime cease to act as a manure, and operate as medicine to a diseased plant?

Again, he says, "that after vines had become affected, the best remedy was to cut the stems off close to the ground." This was intended, doubtless, for the instruction of farmers; but before adopting it, I would inquire if it is based upon scientific principles? If we would kill bushes, root and branch, science has told us to cut the stems off close to the ground, in August. Thistles and weeds are killed by the same process. The roots of thistles and bushes are killed more certainly in August than in any other month, because the hot weather of that month is more sure to produce fermentation, or, in other words, to rot the roots. But Dr. Jackson says that when the vines of the potato become "affected"—that is, dead—the best remedy to keep it alive, to prevent the tubers rotting, is to cut its head off!

He says, again: "I observed that the potato began to rot next to the skin, and the disease penetrated inward in many cases to the depth of half an inch." This description is true, and applies to Maine as well as New York, and proves to my mind that the potato had no internal disease, but was made to rot by an external influence. This external influence was fermentation. But the potatoes, it is said, rotted principally after they were dug and in the cellar. Very true; and what was the cause? The month of August was extremely dry and warm in New York, and the month of September in Maine; and although the vines were killed some time before digging, there was not moisture enough in the tuber, or in the soil, to produce fermentation. The fermentation being partial or incomplete, produced a dry rot. When put in the cellar in large piles, moisture collected and caused rot. This has been a wet season, and the rot is not altogether external, or dry. The doctors would call this difference in the rot, I presume, a new type of the old disease.

A Glenburn Farmer.

From the Boston Cultivator.

DRYING POTATOES.

"A Glenburn Farmer" says, in a letter to the editor of the Bangor Courier, "*keep potatoes dry, and they will not rot.*" We copy the following extract from his letter:

"I assume it to be a fact that the potato is not diseased. The tops of the potato have been killed, extensively, the two past seasons, and, as a very natural consequence, the unripe, half-grown tubers have rotted. The cause of the rot is fermentation. Prevent fermentation, and the frightful 'potato

plague' is cured. This must be done by drying. Any farmer who has a rotting field of potatoes may save them by digging and *spreading them so thin as to dry the surface, and keep them dry until cold weather*, and he can then safely stow them away in the cellar. Drying any substance, as every one should know, will prevent fermentation. Fermentation in vegetable matter produces decomposition, and decomposition is rot."

Remarks by the editor of the Boston Cultivator.—Drying potatoes may be a good method to save them from rot, and it may be well to save them in this way; yet by exposure to the air they will lose much of their good quality. If potatoes lay in a box or barrel, open to the air, and in a room, shed, or other place out of the cellar, they will lose much of their good qualities in five or six weeks. To preserve potatoes in good condition, they should be dug with as little exposure to the air as possible, and put in a cellar, in a close bin, cask, or box, and the cellar should be closed so as to exclude light and air. Yet it may be better to save them with a loss of a part of their good properties, than to let them decay; but we would caution the lovers of good potatoes against too much exposure, as it will cause a great depreciation in their value.

From the Ohio Cultivator.

A FEW FACTS ABOUT POTATOES.

Mr. John M.c Guffy, of Truro, in this county, (Franklin,) informs us that he planted, on the 28th of May last, two patches of potatoes, of about one-sixth to one-fourth of an acre each. One of them was on land on which cattle were fed (fattened) with corn the fall previous, by which means it was highly manured. On this land one bushel of seed was planted, of the Mershannock variety, cut into small pieces, and three or four pieces dropped in a hill; the hills four feet apart, and the ground well cultivated during summer. The tops grew with great vigor, covering the whole ground; and owing to the fine rains of the latter part of summer, they continued to grow until destroyed by frost in autumn. On digging, the product was found to be $77\frac{1}{2}$ bushels, (from the one bushel of seed,) and the appearance of the potatoes was very fine.

The other piece of land, of somewhat less extent, was planted with three pecks of the same kind of seed, but *no manure* had been applied, and less labor was bestowed in cultivation. The weeds were allowed to grow after wheat harvest, and the tops, which were much less luxuriant than of the other piece, were all ripe and dead before frosts came. The yield of this patch was only $24\frac{1}{2}$ bushels.

Both these lots of potatoes were dug at the same time, and buried in the same manner, in trenches in the ground. In a few weeks it was discovered that those from the rich ground, and which had the tops destroyed by frost, were beginning to rot. They were soon taken out of the trenches, sorted and dried, but the disease continues to spread among them to such an extent that it is doubtful whether any will be saved. But those from the ground which had no manure, and where the tops ripened before the appearance of frost, have not shown any symptoms of decay.

Mr. Thompson, on a neighboring farm, also had a patch of potatoes

which were ripe before the frosts appeared, and his have shown no disposition to rot; while another neighbor, Mr. Miller, had a patch that was green until killed by the frost, and his potatoes have nearly all rotted.

These facts have induced the farmers in that township to suppose that the disease is caused by the killing of the tops before they were done growing. This, we believe, has in many cases appeared to *induce* the disease, but many facts have been found to prove that it is not generally, if ever, the ultimate *cause* of the evil.

From the Boston Cultivator.

CAUSE OF THE POTATO ROT.

E. G. Buxton, in the Maine Farmer, states an experiment which he made in growing some potatoes in the cellar, in a dark place, and they were affected with rot, like those raised in the field. From this he infers that the disease is not caused by rust, heat, cutting the seed, &c., but that the cause is in the potato. Some person, commenting on this, attributes the cause to disease in the previous crop, which was not perceptible, and was transmitted to the new produce.

We do not believe in either of these causes. We do not think the potato is running out, or generally declining, and will finally become extinct, as is said to be the case with some species of animals and vegetables; which is the view, as we suppose, that Mr. Buxton takes of the subject. And though the disease may in some cases be transmitted by planting infected seed, this is not the general cause; for, on this principle, how did it originate, and why does it prevail to a vast extent this year where it was unknown before?

Then, what is the cause? is a question that will naturally be suggested in the minds of our readers. We expressed our opinion when this subject was first agitated, and the hundreds of causes assigned, and the numerous arguments offered in favor of one supposed cause and another have only tended to confirm us in our opinion, which is, that the disease is caused by an *unfavorable atmospheric* influence. This is rather indefinite, but we would rather be *indefinitely correct* than *definitely wrong*.

Now, as no cellar is air-tight, and probably no cellar is kept shut during the whole year, the same air that generally prevails around a cellar must in some measure pervade it. Our object now is not to defend the position we have taken; we have before given some reasons for it, and we may give more at another time, but we wish to show that the causes above assigned are not correct, and that the case named does not in the least militate against the view which we have taken, and frequently expressed.

For the Indiana Farmer and Gardener.

THE POTATO BLIGHT.

Mr. Editor: Something like ten days ago, and after the late rains had commenced, I discovered that the leaves on the tops (of one patch) of my potatoes, which extended horizontally, were dead. They had the appearance

of having been frost-bitten, and were of a dark brown color. I attributed it to too much wet, as they were situated in a low piece of ground, where the water (when it falls as copiously as it has of late) stands for some time after falling. I took no further notice of it till two days after, when I found the entire tops were in "the same fix," though they always had kept their erect position. It occurred to me then that the disease so much spoken of in the east had extended to this region. What are the symptoms of that disease? Does it show itself this early in the season? I have examined another lot growing on high ground, which is yet entirely free from this defect. I send you by the bearer a sample of the affected potato tops, that you may examine them for yourself, and give your numerous readers your opinion upon the subject. Yours, &c. M.

For the Genesee Farmer.

THE POTATO DISEASE.

Dr. Lee—*Dear Sir:* The writer of an article copied into your December number says: "Be very careful not to plant potatoes infected with the disease. Avoid planting potatoes in places where they grew this year." The following facts illustrate the respective value of these two directions. Upon a farm I have in Bradford county, Pa., there grew in 1844 three fields of potatoes. They were planted before I came into possession; but I believe the seed was all sound, and from the same stock. One field was new land, very high and dry. The other two were older land, lower and moister. Every potato grown in the first field was sound. In the others some were diseased. The next season, (1845,) one of the lower fields was again planted, using seed from the high ground. The summer was drier than in 1844, and the produce was all sound; as was also that on some adjacent green-sward planted with the same seed. Further to prosecute the experiment, I had some infected seed planted on a part of the green sward, and there the crop was more than half lost. There was no communication of the disease, though the sound and diseased hills were but three feet apart.

In my professional rides over the mountains and valleys of Bradford and Chemung counties, I have observed the farmers in the valleys suffering so much the more from this scourge, that I have often advised them to procure seed from their highland neighbors.

The inferences from my observations are, that the disease is not contagious; that it is perpetuated by infected seed, and not through contamination of the soil; and that low, moist localities are most obnoxious to its influence.

SUMNER RHOADES, M. D.

Blossom's Hotel, *Rochester, December*, 1845.

For the Boston Cultivator.

THE POTATO DISEASE.

Messrs. Editors: For some years past a great deal has been written on farming, and I have read much on the subject, and I think it has been a

great benefit to me. I find much in your paper on the potato rot, and I will add a fact from my own experience. My potatoes first rotted in 1844, though not so much as my neighbors. I dug and put them in the cellar as usual, where they rotted badly.

This year I planted in several places, and some of them were badly cracked and very poor, but on one piece a part of the land descended to the north, where the influence of the sun was less, and on this part I had as good potatoes as I ever raised. For twenty-five years past, the potato crop has generally succeeded well among us, and I intend to continue to improve the seed time, expecting to gather a good crop.

EDMUND L. LANE.

KILLINGWORTH, CT.

From the Worcester Spy.

One of our subscribers informs us of a fact, which may be of some practical importance, in relation to the rot in potatoes. He says that he raised in his garden, the last season, six or eight bushels of the "Schaghticoke," or peach-blow potatoes. A part of them were carried directly to the cellar, and put in a barrel; the remainder were put upon the wood-house floor, where they remained two or three days, till they were well dried, after which they were put into the cellar. Those which were first put into the cellar, in a barrel, decayed entirely, while the others remained sound through the winter, and were good potatoes for cooking. If a short airing and drying, after potatoes are dug, will have the effect which it appears to have had in this instance, it is a very important fact, and ought to be generally known.

From the Ohio Cultivator.

THE POTATO ROT.

The editor of the Sandusky County Democrat says: "We hear almost a general complaint, among the farmers of this county, of the potato crop being affected with the *rot*. The crop has turned out better than any one expected three months ago; but since it has been gathered, and the existence of the disease known, doubts are expressed as to there being enough for home consumption for the year to come. Some attribute the rot to the drought; others, to a particular soil. We should like to have the opinion of the editor of the Cultivator, or any of our experienced farmers, upon this subject."

From the Boston Cultivator.

It seems that the prevalent disease has not long existed in the potatoes; that there has been a gradual increase; which demonstrates it to be something more than mere casual. But I notice several combined causes which promote this rot in the potato, which I think can be obviated in a great measure In the first place, we know the potato is a tender plant, and cannot withstand a great deal of hardship; we know, too, that the past season

has been one of great extremes of heat, dryness, and moisture—consequently unpropitious for the potatoes. I speak particularly of our vicinity, where the earth was so severely parched, wet, and dry, that we had nearly given up all hopes of a crop. After a very heavy rain it remained hot, while we had alternate extremes of heat and rain, which set the earth in a great fermentation, a state very injurious to some sorts of vegetation. From notices I have taken the present and last season, it appears to have had great effect, and almost exclusively on rich moist soils, or moist soils highly manured. In my observations and inquiries I have found a failure of more or less by rot, and often a total loss. Our crops commonly are 500 to 2,000 bushels. I have heard of instances of good crops from new sward, without manure, but in this mode there are failures. I have taken some pains to go on different fields to ascertain facts, and nowhere have I found any rot on light soils lightly manured. I can give no better account of a successful culture than to name my own of last year—1844.

We planted pink-eyed potatoes—some early, on high ground—manure spread. We ploughed in June a piece of rich clay loam, manured in the hill, (a common quantity,) and planted the same kind. They yielded well. We harvested about 400 bushels; put them in the cellar without any suspicion of rot, but soon found, by close examination, that they were decaying. The whole were overhauled in season, and were nearly all saved. I planted a small patch of long reds on very rich moist soil—found them considerably rotten.

From these circumstances, and looking a little farther among my neighbors, I this year was so wary as to plant all light ground, some sward and some old ground—all planted early—all manured in the hill lightly with compost manure, made from rich low ground, hauled into the yard after haying, to mix with cattle manure, and hauled out in the fall. This kind of manure will not ferment. My crop this year is tolerably good, and all sound. I will observe, that I planted several pieces and many varieties of potatoes. It is found that the early planted better escape the rot than the late.

From what I have seen and heard, I may presume to say, that if we have just such another season as the last,(which was a very uncommon one,) by pursuing my practice, with my advice, farmers may raise a crop of good potatoes, although not so abundant as usual on rich soil. There is a diversity of opinion as to the cause of this rot, and its various operations. It is certainly new; and I fear it will continue, in some degree, in more temperate seasons than the last. We have, however, great reason to expect more congenial seasons for the potato crop; less extremes; light and frequent rains—never so heavy as to wet through all the hill, especially after the potato is half grown. They will not live long in a quagmire, or in earth full of water. The rust and specks in the stalks, and falling of leaves, all proceed from the affected roots. Reduce either of the causes named, that combine to effect this rot, to a medium, and the rot will not be produced. For instance, plant rich moist ground, the temperature low, and, and with the other extremes, there is no rot; light, even rains, with other extremes, no rot. Yet all these causes combined will surely effect a rot; that is, while in a certain stage of growth—not, as some have it, in one certain day or hour. But to escape all these evils combined, plant light ground, manured as I have observed, or without any. Light soils are so porous that they do not retain the abundance of wet; nor is there to

be found the other materials, richness, &c., to co-operate to produce this disease.

Numerous causes assigned for this rot seem to be without proper grounds. Some suppose it to be the effects of electricity. I know not why vegetables should be affected any more now than heretofore, by that component of the atmosphere, which has always existed, and is always necessary, and is no more abundant than usual. Some impute the cause to the "old, long, worn-out" potato as gone down; others to defects in the tops, from rust, and specks of rust—the tops sickening and the disease passing down to the tuber; others, to atmospheric disorders, &c. Are these correct, when, in the same field, side by side, the rich highly manured soils are the only soils where the disease is found, and when on light soils they never have been found with this new peculiar disease? Are not the tops as much exposed on light soils as elsewhere?

A. ROBINSON.

From the Northampton Gazette.

The *potato disease* is noticed in many places. We have seen it stated that those localities which were visited last year have escaped this. This may be true to a certain extent; but that the disease has appeared of a more or less aggravated character in the same localities both years, is unquestionable. The St. Albans (Vermont) Messenger states that the rot is quite extensive in that vicinity. Many fields do not yield as much as the seed planted, and all fields are more or less affected. The disease prevailed to some extent there last year.

We had supposed that potatoes in this vicinity were quite free from the rot; but we learn that many of them are rotting since they were harvested. We are informed that a farmer in Ashfield barrelled and sent to Boston 600 bushels. Soon after their arrival he received a letter requesting him to come and remove his *rotten* potatoes. He immediately went to Boston, picked them over, and out of the 600 bushels obtained only *one hundred* bushels of sound potatoes! The same informant states that many potatoes are rotting in the cellars at Whately.

From the Maine Farmer.

EXTENT OF THE RUST IN POTATOES.

The disease which infests the potatoes, we hear, is very prevalent in the eastern sections of the State, especially in the vicinity of Eastport, and it also extends into the province of New Brunswick. We have not heard from Nova Scotia. It is a great calamity not only to us, but to the citizens of other States, who have been in the habit of depending on Maine for their supply of this useful and necessary article of food. What the real extent of the disease is, cannot be told until the digging season is over. People who dig their potatoes should be careful where and how they put them away, for they will need watching and overhauling, lest a few decayed ones may ruin the whole. We have seen potatoes, that were very fair when dug, commence rotting in a few days, and soon become worthless.

For the Boston Cultivator.

POTATO ROT.

Messrs. Editors: Much has been said and written with regard to the failure of the potato crop, and yet there is much diversity of opinion with respect to the true causes. My theory is, that the potato rot cannot be traced to any single cause, but to a combination of causes, all operating to produce a failure; all of which may be termed atmospheric influences. The failure last year was comparatively slight, and was caused by the potatoes being absolutely baked by the hot days and nights of September. The failure this year may be attributed to other extremes.

From the latter part of May until the 7th of July, the season was very cold, dry, and backward, accompanied with high winds, which seriously retarded the growth of the plants, if it could be said they grew at all. Warm rains then set in, with an extremely high temperature, the thermometer ranging, through July and August, from 80 to 90 degrees. This forced the plants to a rapidity of growth never before known, especially on rich soils, *where the potato has been most affected by rot.* The tender plants, thus quickened into a premature existence, by almost the growth of a day, soon yielded to the influences of the intense heat of the sun, with constant exhalations from the saturated earth. Fermentation followed as a consequence to the tops, and the tubers fell victims as a matter of course. At the time of this process a strong effluvia arose from the potato fields, and it was only necessary to pass to the leeward of them to be convinced of the work of destruction by a sense of the olfactories. Now, as concurring proof, as I have remarked, the potato has suffered most on rich soils—and why? because the tops were more forced in their growth—were more delicate in their fibre—were more susceptible, and more easily affected by atmospheric action.

That we have been visited by unusual atmospheric influences, and that the whole vegetable kingdom has been powerfully affected, is further evident from the sickly hue of the larch, and all the evergreens; in fact most of our forest trees commenced shedding their leafy tributes without the usual aid of frosts, giving token that they were obeying some new law of atmospheric phenomena. Extremes under different phases, or unlike the foregoing, may have produced the same effect upon the potato in other parts of the world. That they have had an extraordinary season in Europe, all accounts agree. It is therefore that I consider the failure of the potato crop in Maine, partially in '44 and almost wholly in '45, as *caused by extremes of atmospheric action*, such as have never visited us before, and probably never will again.

I would take this occasion to caution all brother farmers (and there are many) who have imputed the rot to a disease of the potato, (which will probably continue,) and have determined to plant less, to entertain no such impressions, but to plant the next season with as much confidence as they would, had we never been visited by the calamity. Many have supposed the rot was caused by insects attacking the tops; but, wherever they have been noticed, they have appeared more as a consequence than a cause, for it is well known that all vegetable matter in a state of decomposition attracts insects, or animalculæ.

Yours, respectfully,

HENRY BUTMAN.

Dixmont, Me., *November* 3, 1845.

From the Delhi (Delaware county) Gazette.

Look to your potatoes.—We hear from different sections complaint of the rot in potato heaps and in cellars where large quantities are together. One farmer in Meredith informed us that he had lost about one-half of a heap he had buried. We had a quantity in our cellar examined, and some three or four bushels of injured ones picked out of about sixty or seventy bushels.

From the New York Farmer.

IN THE NEW YORK FARMERS' CLUB.

Chairman.—By treating diseased potatoes with lime, I have observed that the disease was arrested, and when they were boiled the diseased parts readily separated from the sound parts. I believe it to be contagious—not attributable to climate or to season, but to a temporary evil, analogous to that which has affected the sycamore trees.

Townsend, of Astoria.—I have raised potatoes for this market for fifteen years past, and I believe that this disease is owing to the seasons. I have tried all manner of ways with them. Last year they were generally diseased, but this year they are perfect. I planted some and did not till them, to see what that would do; a small crop from that experiment. Those that I tilled with the greatest care were the best. Mine have no disease this year in any way or shape. I generally bring to this market from three to five thousand bushels of potatoes per annum. This year my early ones were a good crop; but my late ones, owing to severe drought, a small crop—but all good and sound. I have spent, in experiments, more than my potatoes this year are worth.

Judge Van Wyck.—Climate and season no doubt aggravate the disease. I found it existing three years ago on my farm in Jersey, in a wet season; and next season, which was dry, worse still. This last season, which was very dry, the rot was worse yet.

Townsend.—I planted from the diseased crop of last year, yet I have good potatoes this season; and I have been offered a dollar a bushel for those of my early crop, but have no more to spare.

Dr. Field.—Last year my early crop was good, and the late were diseased. They were all of the Mercer kind. This year my late crop is good. I think, with Mr. Bridgeman, that those planted quite early or quite late are good—having avoided our great midsummer heat. The red merino potato (a long one) I found best for planting. The disease is fungus, I have no doubt.

Mr. Meigs remarked that many persons uttered impatient observations relative to this hitherto fruitless investigation, but he trusted there would be no relaxation in one so important; that, by assiduous inquiry, mere accident might reveal the causes which no theory could unravel.

Mr. Fleet.—I must say that, notwithstanding all that has been said about the potato rot, hardly a single fact has been made known, which can govern us for the future.

Mr. Hancock.—The soil of Kilkenny is remarkable for the presence of anthracite coal, while that of Athlone is a level peat bog.

Chairman.—The disease is fungus, beyond all doubt.

Mr. Lodge.—There are many species of the fungus. Decomposed vege-

tables produce fungus. I can produce it in that way in a few hours. But a thoroughly clean cultivated potato will have no fungus upon it.

Dr. Field.—It is fungus, which is as perfect a plant as others, yielding its seeds for future growth. When the seeds of fungus fall on the bark of healthy trees, they take root and grow.

* * * * * * * * *

Col. Clark.—I reiterate the experiments which I have tried on the disease. The first was by a weak solution of the chloride of lime. 2d. A saturated solution of the same. 3d. Pure quick lime. Potatoes in the first shrunk; in the third, shrunk considerably; and in the second remained plump. These potatoes, when boiled, were good; all the diseased specks, from the size of a pea to that of my thumb-nail, came out of the potato, leaving the rest good. The disease is undoubtedly fungus, and the saturated solution No. 2 destroyed it. With a powerful microscope I did not discover any insects. The want of an adequate portion of lime in soil, may, in a measure, account for the existence of this disease. Recent quick-lime or unslacked ashes applied, will, I think, cure the disease.

Mr. Wakeman.—The London Farmers' Magazine for last October states that salt and lime are deemed capable of preventing or curing the potato disease.

Mr. Steele, of Jersey City.—I laid in my winter stock of potatoes, and lately found some rotting, (melting, as it were ;) the liquor, touching sound ones, caused them to rot. I have separated them. I think the disease is fungus.

Col. Clark.—The causticity of the lime destroys the fungus: potatoes should be kept dry.

FARMERS' CLUB—LIME FOR POTATO ROT.

To the Editor of the Farmer and Mechanic:

SIR: In your paper of the 20th November, 1845, under the caption of "American Institute—Farmers' Club," I have been reported to have said, in respect to some experiment which I had made, corrective of the disease in the potato, which is in a greater or less degree prevalent throughout the civilized world, that the first application to the potato "was a weak solution of the chloride of lime; 2d. A saturated solution of the same; 3d. Pure quick lime." This representation is incorrect, and calculated to mislead and produce injury, inasmuch as the adoption of such treatment in detail, as set forth in the report, would be productive of real mischief—at least, so far as a saturated solution of the chloride of lime is concerned.

In the remark which I made at the Club, I stated that I had made three experiments, curative of the disease in the potato.

The first consisted in subjecting them, in their diseased condition, to a weak solution of chloride of lime in water for twelve hours.

The second, in steeping them in a saturated solution of common lime-water, made by putting a lump of recently burnt lime in water, for the same length of time.

And the third consisted in sprinkling the potatoes, in their moist state as taken from a heap, with recently burnt lime-water, slacked to dryness.

The potatoes treated in all these modes were kept under cover, and spread so as to dry; and the disease which had attacked them was wholly arrested, (insomuch that, on being boiled, the blotches or affected parts came off with the skins,) while those which were neglected, and from which those experimented on had been taken, continued to decay, and were finally thrown away.

The potato treated with a weak solution of the chloride of lime had shrunk considerably, as had those also which had been sprinkled with dry quick-lime; but those which had been steeped in common lime-water were plump and in good order for cooking. From all which it follows: First, that the potatoes steeped for twelve hours in a saturated solution of recently burnt or quick-lime in water, and then dried, were the best. Second. That the other two were shrivelled—those sprinkled with dry quick lime the most so; but both, after an exposure to the air about six weeks, were edible.

From these experiments, I have reason to believe that the disease in the potato may be prevented by a slight application of finely powdered quick-lime, or of unleached ashes, at the planting or first dressing season; and I recommend to farmers to make trial of this simple and economical preventive.

Yours, respectfully,

EDWARD CLARK.

NOVEMBER 29, 1845.

From the New England Farmer.

FIRST AGRICULTURAL MEETING AT THE STATE HOUSE, BOSTON.

Hon. Mr. Stone, from Hardwick, made some remarks on the subject of rot in potatoes. He said the lady-finger kind had not been injured. The long red had also escaped the contagion as generally as any kind. He hoped that more people would communicate facts on this subject, to enable us to come to some general conclusion as to the cause of rot.

Mr. S. W. Cole said he passed through towns in Maine last fall, and he found the lady finger had been affected as much as any kind. He found that the long red had escaped as free as any species that he had seen. He made some remarks on the remedies that had been recommended. Salt had been used in various ways, but he thought salt had done no good; for potatoes near the sea-shore, and potatoes covered with sea-weed, were found as much affected as any others.

Mr. Cole thought the rot should be ascribed chiefly to atmospheric influence. He said apples of various kinds had been affected in the same way. Jewett's fine red he had known for thirty years, and he had never seen it so much affected with rot as in the last autumn. He thought the atmosphere might affect various kinds of fruits in the same way as it affects the potato.

J. A. Morton, esq., from Hadley, said he could not learn much from any one as to the cause of the rot. Where he put lime in the hill last spring, his own potatoes were not rotten: he put a small handful in each hill.

From the N. Y. Farmer and Mechanic.

Morrisania, *December* 16, 1845.

Dear Sir: I have paid some attention to the many complaints that have gone the rounds of the papers relating to the disease in the potato. And truly it may be so called, as, in all instances where lands are not tilled properly to carry out the work natures requires, disease will more or less follow; and here I beg leave to remark that ever since the *solanum tuberosum* was introduced into Europe, which is now only two hundred and forty-eight years, it has been improving in quantity and quality, and is invariably best where most labor has been bestowed upon the land. Our seasons vary—sometimes very hot and dry, followed by heavy freshets and floods. Lands thus drenched, and not drained by proper deepening and breaking through the hard pan, must suffer, and will inevitably cause curl in the leaf, premature its growth, and stop the progress of the tuber, and in this tender state disease will follow. Some persons will say, " my land lies high and dry," and therefore does not require draining, but moisture. Then I say, deepen your land, that it may receive rain when it comes; and by continually working the crop you will retain it. This vegetable should be kept in constant growth until it is matured, or the crop will fall short. To do this work properly, turn your potato land in the fall; again as early in spring as possible; cross-plough with the sub-soil, or trench. Manure broadcast—compost is best—charcoal, animal and street manure, ashes, sea-sand, lime, soot, &c.; add to this as much vegetable and barn-yard manure, and put fifty ox-cart loads to the acre, and well attend your crops while growing, and you may expect to receive a full reward and no disease. Some will say, " my land is worn out;" this is ofttimes a fact. Then, again, I say, till and dress; for when the lands have been longest under cultivation, and most labor bestowed, with good judgment, there is best potatoes and best crops. If our laborers are high, and cannot work quite so close as in Europe, we can take the broad field culture and the advantage of two hundred and forty eight years' of experience, and, with one or two yoke of cattle and sub-soil plough, equal any of our wishes.

I will refer our farmers to last summer's dry weather, where lands were not tilled. It was as dry as though rain had not been upon it for years; and when the plough was kept constantly at work, the moisture was retained, the lungs, fibres, and tubers fed, and a full crop obtained; and here I do not wish to leave you, for all esculents and roots naturally require their soils tilled deep, to allow the frost, sun, wind, air, and all other natural elements, with summer and winter fallowing, to cause a wholesome, good, and full crop; and by strict adherence to labor and nature, you may raise any quantity a reasonable man may desire. And as crops of the above are invaluable for all farming purposes, particularly in wintering cattle, as you will bring them out in the spring to fill the pail, or bring down the scale, your yard will be filled with manure, ready for any crops you may apply it to. Yours, &c.,

J. LODGE.

P. B. Wakeman, Esq.

Mr. Lodge presented to the club ready boiled a dish of his last crop of potatoes, which were eaten by the members, and found to be fine and mealy—excellent.

A letter was read from R. L. Colt, esq., of Paterson. Extract: "Let me tell you about my experience with potatoes. The crop on my grounds is short, but free of rot. I have cultivated old grounds, and used on them a compost of one part salt, one lime, one plaster, and two of wood ashes. Also, the same with guano mixed, and the same with bone dust mixed. There was very little difference in the result—rather in favor of bone-dust and guano. On new ground I used ashes, salt, and plaster; on this I had the *best* potatoes, but no rot in either. From this, I came to the (perhaps wrong) conclusion, that salt, lime, and plaster of Paris will prevent the rot. At all events, I mean to try the same experiment next year, and not put barn-yard manure either to corn or potatoes. My barn-yard manure I put in a heap, mix it with lime, ashes, and plaster, and, when well rotten, and all seeds destroyed, put it on the grounds."

From the New York Farmer and Mechanic.

FARMERS' CLUB.

POTATOES.

Nathaniel Sands, Esq., of New Windsor, Orange county.—I will state my experiments in raising potatoes. I have found that in planting them as early as possible I have good crops. The tops perished in August. I let the potatoes lie in their hills till September, and had perfectly sound ones. I have seen some disposed to decay, upon which I put lime, and these were saved from further rot. A neighbor of mine had a pond, from which he let the water flow upon his potato field in dry weather. For ten years past he has had always sound potatoes. They are of a fine quality. To prove the efficacy of this watering of his potatoes, he had another field which was left dry, and there his potatoes rotted. There are many fields which may be selected for potato planting, so situated as to admit of such watering.

Mr. Wakeman.—From the examination which I have made of this subject, early planting cannot be altogether relied upon. Some late planted crops were good, while the early ones were rotted. A good crop seems to demand all the benefits of a favorable season.

Mr. Chapin.—I have examined the proceedings of the Entomological Society, and will present at the next meeting of this club their conclusions relative to the insect theory as affecting the potato.

Mr. Wakeman.—The opinion that the potato disease is owing to the length of time which the potato has been domesticated, seems to be the better one. The potatoes which we now have are all descended from those first carried to England by Sir Walter Raleigh.

Mr. Sands.—In 1843 I first noticed this disease. I took pains to procure tubers from sound crops. I planted them very early; they grew well and kept sound. Those which I planted in April were good. Those I planted on the 25th of May proved nearly all diseased. By my mode, we seldom now have a diseased potato; and, generally speaking, those planted late proved to be good.

I suppose that our bad seasons for potatoes have been those of great drought, followed by heavy rains.

Mr. Wakeman.—Doubtless a regular supply of moisture will insure a healthy product.

Mr. Sands.—The tops of my potatoes totally died in August, but the potatoes kept well in their hills till dug in September. What I call late planting is late in June. I do not let my planted potatoes be in immediate contact with the manure in the hills. I find that when the rain comes, and soaks through the soil and manure, the potatoes do better than when in close contact with the manure.

JANUARY 20, 1846.

From the Albany Cultivator of December.

POTATO ROT.

In this section we have heard but little complaint in reference to the disease or rot in the potato, this year, till since the crop was harvested. In some other neighborhoods, too, we have heard that heavy losses have been sustained by the potatoes having rotted since they were dug, though while the crop was growing it exhibited generally a healthy appearance. The Boston papers make complaints of potatoes rotting much in the cellars; and within a few days we have heard of many having rotted in this vicinity. Some kinds seem to have suffered more than others; the very excellent kind called *Carters* appear, from statements we have heard, to be more inclined to rot than others. A gentleman in this vicinity, who raised this kind quite largely, has lost half his crop since they were put in the cellar. The Shakers, located at Watervliet, also raise the Carters largely. They informed us a few days since that they had lost from $600 to $1,000 worth of this kind since they were dug. As to preventives, it is agreed that they should be carefully sorted over, rejecting all that show the least unsoundness, as soon as they are discovered to be rotting. The Shakers inform us that the best remedy which they have discovered, (and they have tried many,) is to *dry them thoroughly* by spreading them exposed to the air. This, they say, will stop the progress of decay, and it is the only way they know by which it can be stopped.

From the Ohio Cultivator.

USE OF SALT AND LIME.

The Akron (Ohio) Democrat states that the Rev. Mr. White, of that place, in removing some potatoes, filled two barrels, one of which had been used for flour, and the other for salt, from the same heap, and put them side by side, covered with the same boards. After some time, those in the salt barrel were found perfectly sound, while those in the flour barrel were all, or nearly all, rotten.

This would go to prove, what has before been asserted—that *salt* is, in some cases at least, beneficial in preserving potatoes from the rot after harvesting. *Lime*, also, has been found useful for this purpose; but more experiments are needed with both, before the question of their utility can be fully settled.

From the Albany Cultivator.

THE POTATO ROT.

Mr. Editor: Although a farmer on rather a limited scale, it has fallen to my lot to make a few observations relative to the disease called the rot in potatoes, which, were they published, I have thought might be of service to some of the agricultural community.

In 1844, I planted potatoes on three different parts of the farm on which I am situated. From part of one small field, consisting chiefly of a loose gravelly soil, I obtained about eighty bushels of potatoes; and among these eighty bushels there were probably near a peck of rotten ones, and almost all of these grew on a part of the field which was lower than the rest of it, and where the soil consists, to a considerable extent, of loam and clay. The field I have been describing was ploughed twice before planting; and in that, as well as in the subsequent work among the potatoes, it was my aim to work when the land was in a sufficiently dry state to pulverize well.

On another part of the farm, which is nearly level, and where the soil consists, to a much greater extent, of loam and clay than the field I have just described, I obtained nearly thirty bushels of potatoes, and out of thirty bushels there were probably as many as one bushel of rotten ones. The land for these potatoes was also ploughed twice; and care was also taken to work the land when dry enough to pulverize.

From a part of the farm, which consists chiefly of a side-hill, of a loose gravelly soil, I obtained as many as seventy-five bushels of potatoes; and out of these seventy-five bushels there were probably not to exceed four quarts of rotten ones; and what rotten ones there were, were almost wholly on a part of the field which is nearer level than the rest, and where the soil consists, to a greater extent, of loam and clay than the other parts of it. The seed potatoes planted on the last mentioned piece were many of them of the same sorts as those which rotted so badly in the small and nearly level piece I have before described.

A part of the growing season of 1844 was unusually hot and wet. And these are probably among the causes why so many potatoes rotted that season. From my own experience, and from observations I made this season, (1844,) I came to the conclusion that light loose soils, and thorough ploughings, are among the best means of obtaining potatoes free from the rot. And at the same time it may be said, that rich soils with such management are well adapted to withstand any ordinary drought.

This season, (1845,) the disease among potatoes has assumed a somewhat different aspect in this region of country from what it presented in 1844. In many cases, the potatoes which at digging time appeared to be sound, have rotted after being buried in the field or put in cellars. And while I do not dispute that this result is in some degree attributable to the varieties of potatoes used for seed, yet my observation leads me to believe that much of it is to be charged to the wet, heavy state of the lands on which the crops were raised. And the following is one of my reasons for believing so:

This season I planted near one acre of potatoes on land which consists almost wholly of a light loose soil. The ground was ploughed three times before planting, which rendered it so finely pulverized that the heavy rains of the latter part of the summer had an opportunity to leach down so as not to remain in a superabundant quantity near the top of the ground. Out of this acre of potatoes there were probably not to exceed two quarts of rotten

ones; while some of my neighbors, who planted their potatoes on partially pulverized and wet, heavy land, had many of theirs rot, although they had, in part, the same kind of seed that I planted.

S. S. G.

SANDLAKE, N. Y., *November*, 1845.

From the Albany Cultivator.

MR. EDITOR: The potato disease occupies so much of the public attention every where, that the experience and observation of individuals may lead to a solution of this mystery.

Last year we lost but few by the rot. This year but few have escaped. We have lost upwards of 1,000 bushels already. I have examined the various fields about us, and find there is little or no perceptible difference as to soil. The disease has shown itself in every variety of soil in western New York where the potato grows.

Still I am not discouraged, nor do I believe there is any more danger of the extinction of the species than of wheat. My own impression is, that it is caused by the peculiar state of the atmosphere, and that the evil may be cured in two ways—

1. By early planting, and by using only the early varieties.
2. By cutting the stems or vines as soon as the blight or rust shows itself.

So far as my observation extends, the disease is analogous to the rust in wheat. It has been shown in a great number of cases, by actual experiment, that if wheat be cut as soon as the rust strikes the stalk, the loss is much less than when suffered to stand until it is ripe. If allowed to stand, the kernel becomes light and shrunken, yielding but little beyond bran. The disease appears in both instances in the stalk first, and the destruction of the farina in the tuber and the berry is but the result of the destruction of the stalk by the disease. It is a species of gangrene, which can only be arrested by severing the limb as soon as it appears. The remedy has been quite successful in wheat, and I have no doubt will be equally so with roots. I am the more inclined to this belief from an occurrence in my immediate vicinity. A neighbor had some potatoes planted in a very mucky piece of land, a reclaimed swamp; being in low ground, an early frost killed the vines. Some of his potatoes have rotted, while those near by, but upon drier ground, and where the vines were not injured by the frost, have been seriously injured. It was not the soil, for others in like soil, but not reached by the frost, have been destroyed. Again, our early potatoes which we grow in the market garden have not been affected; and generally the early varieties have suffered the least. I can hear of none that have been diseased where the vines died before the blight struck them.

It may be that ours is only an exception; I mention the facts for the purpose of drawing out others on the same subject.

My facts are truth; my inferences may go for what they are worth.

Sincerely yours,

T. C. PETERS.

DARIEN, N. Y., *December* 12, 1845.

From the Albany Cultivator.

THE POTATO DISEASE.

L. Tucker, Esq.: Facts being the very foundation of science, it has struck me that the following might assist some inquirer into the causes of the potato disease.

In 1843, the disease among the potatoes showed itself in this country. That year, in many parts of the country, the potatoes rotted in their bins, and it was found necessary to remove them. In 1844 the disease was more prevalent, while in 1845 it was much less extensive. In my own case, very little of the disease appeared among the potatoes raised in either year. Still, there was a little of it among the pink eyes in particular. Having observed that potato balls were very scarce in my own fields, and indeed in all this region, and being confident that the potatoes now raised in this country are much inferior to those raised five and thirty years since, I sent to England for seed. A friend was kind enough to obtain for me twenty-four hampers of fine Lancashire potatoes, last spring, which reached me just in time for planting. I had them placed in new ground, on the side of a field in which were planted pink eyes, trout, and orange potatoes. The yield of all the potatoes was light, on account of the drought, but the Lancashire did as well as could be expected. Four and twenty bushels of English potatoes were put away for seed in a cellar, under a hay mow, where the temperature is hardly above freezing; as good a place for the preservation of vegetables as could be selected. A quantity of the trout and orange potatoes were put in another corner of the same cellar. Fearful that the weather was getting too severe for my seed potatoes, as the mow grew thinner I ordered them to be removed last week to another cellar. On opening the straw that covered the heap, more than half of the potatoes were found to be far gone with the disease. As the rot has appeared in none of the other sorts that were grown in the same field, including pink eyes, I am left to infer that the English potatoes were infected, while the others were not.

I merely state the fact. The disease existing so extensively last year in England may possibly have some connexion with this loss; though, to connect the circumstances, it is necessary to believe that two seasons are required to develope the rot.

I will only add, that I had brought into my house some of the varieties that were grown, the English excepted, and I cannot find that a single potato has been affected. I know of no difference in the culture or land that should have produced this result. No manure was carted on any part of the field, though plaster was used throughout. As piles of logs and stumps had recently been burnt on the land, it is possible these ashes may have reached to these English potatoes, though not more so than to the others, as the log heaps extended over all parts of the field. I do not think, moreover, that the vines ever looked thrifty.

Yours, &c.,

J. FENNIMORE COOPER.

P. S.—It may be well to say that the English potatoes, diseased as they are, have been fed to store hogs, with perfect impunity. What is left of them seems to be as nourishing as the sound potato. They are affected with the black, cholera looking disease, and appear to moulder away, rather

than turn into a semi-liquid, putrid substance, as was the case with some grown in my garden in 1844.

HALL, COOPERSTOWN, *January* 6, 1846.

PREMIUM—DISEASED POTATOES—AMERICAN AGRICULTURAL ASSOCIATION.

At a meeting of the association, Monday, May 5th, the following resolution, offered by Dr. Gardner, was unanimously adopted:

Resolved, That this association offer a liberal premium for a series of investigations into the nature and origin of the disease of the potato, to be made under the conditions imposed by the executive committee.

The executive committee therefore offer, under the preceding resolution, a premium of $50 for the best investigations made during the ensuing season, in accordance with the plan drawn up by the chemist of the association, and appended. They also impose the following conditions: The competitors to be or to become members of the association; the papers and specimens to be forwarded free of expense to the executive committee, through their secretary, Dr. Gardner, 412 Fourth street, New York, on or before the 1st of November; communications, whether successful or otherwise, to become the property of the association; all persons in the United States may become competitors. The premium will be declared at the general meeting in January next. The papers sent to bear a motto, without the name or address of the author, these particulars being contained in a sealed letter superscribed with the same motto. Investigations terminating without the appearance of disease in the potato, but pursued in accordance with the ensuing conditions, will be received in competition.

The following conditions, to be observed by competitors for the premium of the association, are respectfully submitted by order of the executive committee.

D. P. GARDNER.

MAY 8, 1845.

1st. The papers to be entirely original, and in no part transcripts from other works; to contain a record of the observations made during the growth of the plants, and conducted on at least 150 specimens.

2d. The variety and character of the seed potatoes, the mode and time of planting, the nature of the soil, its condition of drainage, the manures used, and previous tillage, to be fully detailed.

3d. A daily register to be kept from the time of sowing to securing the crop, containing the temperature in the sun and shade, and the dew-point* in the shade at 12 o'clock, with the state of the sky, the occurrence of rains, dews, or other meteorological conditions. The manner of taking the dew-point to be stated.

---

*If the observer be not provided with an instrument for ascertaining the dew-point, the following simple method may be adopted: Let a little fresh spring water be placed in a dry wine glass and introduce a thermometer, stir it freely in the fluid, and ascertain the temperature at the moment the dew on the exterior of the glass is disappearing. If spring water be not cool enough to create a deposite of dew, add a few drops of iced water until dew is seen. The dew-point is the temperature at the moment dew first appears or vanishes; but the latter is the best time for examination.

D. P. G.

4th. Five entire plants to be taken up during each week after the third week from planting, and a record made of the condition of the leaves, stems, roots, and tubers, the last being cut open and carefully inspected with a simple microscope, and all unnatural appearances written down, with the day of the observation. Diseased proportions to be preserved by drying, and forwarded to the association.

5th. All insects discovered on the green portions, roots, &c., to be examined, and at least twelve specimens of each species in the perfect (imago) state to be preserved and forwarded to the association. When practicable, the caterpillar to be described or figured, and the habits of the insect recorded. This condition to be performed in the case of all insects whatsoever found preying on the herbage of roots.

6th. At least twelve specimens of tubers in every stage of disease, with a similar number in a sound condition of the same variety, to be forwarded. The leaves and upper parts of any plants presenting a remarkable appearance to be carefully dried between sheets of unsized paper, and at least twelve specimens sent, with all other objects, in the same box or parcel as the written communication.

From the Cultivator.

PREVENTIVE OF THE POTATO ROT.

Mr. Editor: It appears to me that the attention of your correspondents has been directed more to the *cause* or nature of the potato disease than to any specific remedy. Some have ascribed the cause to unusual dews, fogs, heat of the sun, small insects, or parasite mushrooms. We may, I think, safely conclude that the disease is entirely atmospherical, and as *inexplicable* as epidemics that affect the human or animal system. If so, then the only object would be to place the vines in a state in which they would not receive the disease. Thus the ravages of the wheat fly are avoided by sowing earlier than usual, and also rust in wheat by sowing early on elevated lands.

As it respects the numerous *preventives* that have been suggested, none of them appear to be of any general utility. The strewing on ashes, lime, or plaster; the cutting off of the tops; the drying them in the sun, before putting them into the cellar, are only laborious, and, at best, partial remedies. The suggestions of a gentleman from Virginia to plant early, and *at a certain depth*, on light, elevated soil, and to cover the vines two or three inches with leaves, would be, I think, of no general utility, except the early planting; for I find, by observation and extensive inquiries among farmers, that potatoes are affected in every variety of soil, and that every kind of potato is subject to the disease; that is, the same kind will be affected one year and not another, and on all varieties of soil. From these facts, I have concluded that it is not in the *kind* of potato or *state* of soil, but in the *time* of planting, or rather *state* of the vines when the epidemic appears.

Therefore, *assuming* that the disease is in the air, and that vegetables derive by far the greater part of their nourishment and substance from this element, I conclude that the disease is absorbed by the vines, *when* they are in a *state* to receive it, and by them conveyed to the potato among nutritious properties.

As to the time the disease appears, much will depend upon the temperature of the climate where the potato is planted, and the *period* of the maturity of the vines. In Vermont, I conclude that the disease appears from the middle of August to the middle of September, or *when* we begin to have heavy dews and damp, chilly nights. Then the leaves become slightly struck with rust or blight. This kind of weather produces rust in wheat. But the common potato rust, which comes in July or August, must not be taken for the disease, for rust of potato tops is not a new thing.

Now, in this region the tops of *early* planted potatoes generally become so far matured in the fore part of September that they cease to absorb the atmospherical properties. Hence, if this *transition* takes place before the disease has been conveyed to the roots, the potato is safe. I have been led to thus fix the time of the appearance of the disease from practical observation. I planted six kinds of potatoes on separate plats in 1844, all on good warm soil. Three of the kinds were planted about the last of April, and the others about the last of May. The *tops* of the first three plats were partially *dry* by the first of September; the others not until the first of October. The first plantings were free from the disease; the last were greatly affected by it. I tried the same experiment on six kinds last year, and the result was precisely as the preceding year. A neighbor planted the early kidneys in April last; the tops were dead in August. Some of the potatoes remained in the ground until November. They were perfectly healthy. He planted, from the *same* lot of seed, about the first of June, a small patch near his barn, the tops of which grew rank, and were green until killed by the frost in October. The potatoes were greatly diseased. Since then, I have ascertained that the tops of those potatoes that have proved to be diseased were generally green in September, or at least at the time of digging. It does not, however, follow that every field will be affected where the tops are thus immature. I have found two exceptions in fifty cases. In one case the potatoes were planted in July, and were so thrifty in September that the disease did not affect them. In like manner, human constitutions are not *equally* in a condition to take at one time the *same* disease. In the other case, the potatoes, being planted in a high, frosty region, were killed by a frost in the fore part of September, before the disease reached the roots. Hence very early or very late planting will escape the disease. But early planted potatoes are decidedly better for the table or for stock than late planted, unripe ones. Therefore let *all kinds* of potatoes, except those that are *very* long in coming to maturity, be planted early, (for the climate where they are planted) that the vines may partially ripen before the time of the appearance of the disease. It is no matter what the kind of soil is, or the kind of potato, if neither will greatly prolong the maturity of the vines. But avoid planting near barns, where the soil is exceedingly rich, or in low, wet places. Observe these rules, and we think that, in usual seasons, from 200 to 300 bushels of good healthy potatoes per acre will be obtained.

This process may also save the potato crop in Ireland. I am assured by emigrants that potatoes for the summer market are planted early, and are ripened in a pleasant, genial season, while those for winter use are not planted until May or June, for the sake of a long growth and a larger yield, which expose them to the disease.

KITTREDGE HAVEN.

P. S.—To have large thrifty vines in June, through the influence of spring or summer showers, spread in March or April your *entire seed* on grass plats the south side of buildings, and cover them with straw or blankets during frosty nights. The sprouts thus obtained will accelerate vegetation, while cellar sprouts retard it.

K. H.

SHOREHAM, VT.

From the American Farmer.

Experimental report to the Maryland Farmers' Club, on the potato disease: by Daniel Bowley, Corresponding Secretary.

Numerous and conflicting as are the arguments which have been recently held in the various attempts to discover the *nature* of the disease in the potato now prevalent, and if detected, what *remedy* could be effectually applied, the majority, both as regards authority and number, have satisfactorily established the fact that it is a fungus of an excrescent or parasitic character. Equally well sustained have been the numerous assertions that a remedy has been successfully applied.

The most authentic paper on the subject which has fallen under my observation, among some hundreds, is the report by C. Morren, Professor of Agriculture in the University of Liege.

Imperfect in idiom, as is every translation from the German into the vernacular, it covers the whole ground, exhausts the controversy, and, in accordance with my own *experience*, establishes the main practical facts essential to the producer's safety.

Before departing from my allusion to Professor Morren's able report, I think it necessary to contest an error into which certain late writers on the subject have unwittingly fallen.

This peculiar distemper, like all other important facts, has its history. In Mexico and South America, where the tuber is indigenous, it has always been known as an epidemic, recurring at irregular periods, and eccentric in its progress.

The terms *epidemical*, *contagious*, and *infectious*, are often confused in their application, even by the medical profession. In the report alluded to, the word *ansteckung* is rendered *infection*, being literally "*stuck on*," or *extraneous*, from the verb *anstecken;* while the German equivalent for *epidemical* is *ansteckkend*, and *contagious* is expressed by *ansteckend ;* so that this word, as used by Professor Morren, embraces the whole sense of the three words, in their widest construction, and he pronounces the potato disease, after the most skilful and patient examination, to be of this character.

In our own language, we understand that whatever is *prevalent*, is, *where* it is so, epidemical. Certainly no one at this advanced stage of the discussion will assert that the potato disease is not *prevalent! Infectious* and *contagious* convey almost precisely one meaning, commonly called "*catching*." My own observation, as regards the tubers after housing, is, that this disease is *all of these*, in their fullest sense.

Relying upon the usual supply from the east for my seed potatoes, I had

disposed of my own crop, and purchased thirty bushels for early planting, of blue Maine mercers, at the wharf. This was the middle of February last; but before planting time arrived, nearly one-third of that quantity had decayed, although they had frequently been picked over. When purchased, a scarcely perceptible scurfy gangrene, in spots, had made its appearance on them.

Ten bushels were cut and planted on the seventh of March, in strong alluvial soil, in drills, *under* fermenting stable manure; the pieces, immediately on being cut, were dried or healed in a compost of two parts each of plaster (sulphate of lime) and leached ashes, to one part old slacked (carbonate of) lime.

The memorandum in my diary reads thus:

1845, March 7. "Planted early potatoes across run; pieces cut large; dried in plaster, ashes, and lime, and planted under horse manure."

March 25. "Planted five bushels potatoes near poultry yard; the eighth row from the east side without manure, to be guanoed when up; the rest planted *on* long green manure; all in drills; pieces six inches asunder."

The yield of this first planting was very good, notwithstanding the drought, but, being very early, were sold in market; the latter not so well, the guanoed row excepted, which yielded equal to the first planting, or one-fourth more than the second.

There was also another small planting, besides the "crop;" a sample of the last I now hand for the inspection of the club, which they will perceive are in a perfectly sound condition.

I have cited from my diary thus minutely, to correct two errors almost as much prevalent as the disease. The first, that the kind of manure produces the fungus; the second, that it is the nature of the soil, combined with or arising from the humidity of the atmosphere. Now my several plantations were in all the varieties of soil, except stiff clay, and in all manner of exposures, from the hill top to the ditch level.

Undoubted authority overthrows a third error—that is, that the wetness of the season, combined with a sultry denseness and other atmospheric phenomena, generate the mushroom. A friend of mine, a member of this club, lost his whole crop of last summer's growth, whose place is but five miles distant from mine, inland, and some hundreds of yards higher above the marine level, the seed being of his own growth, and apparently perfectly sound.

In fine, gentlemen, not one diseased potatoe have I yet seen in my crop, although the seed from which they were grown was corrupted, and the old-fashioned stimulants, except in the one instance, were used as manures; so that, in the absence of any antagonist principle, I must consider this chemical compost not only a remedy, but a preventive of the epidemical potato fungus.

FURLEY HALL, 1846.

From the American Farmer.

THE POTATO SICKNESS.

Correspondenee between Mr. Peter, British consul at Philadelphia, and Mr. Gowen, of Mount Airy, on the subject of the potato rot.

[Mr. Gowen's reply]

MOUNT AIRY, *December* 29, 1845.

MY DEAR SIR: Your note on the subject of " the potato rot," dated Saturday, did not reach me at Mount Airy (Sunday intervening) till this morning, Monday. It would give me pleasure to oblige you fully in this matter, did time permit to go more into detail; but the brief space allotted for a reply will compel me to be as concise as possible.

I hold that atmospheric influence is the sole cause of the late pervading rot in the potato; that neither manures nor condition of soils could have produced the calamity; that animalculæ and fungi are as remote from it, (the latter may in a partial manner injure a potato plant,) as they would, under peculiar circumstances, be likely to injure other plants; that the rot is *not* epidemic; and I have reason to believe that sound or *partially* sound potatoes, taken from a diseased crop or heap, will, if planted, produce healthy, sound potatoes, in the absence of the cause which injured them the previous season.

I would, therefore, encourage the farmers to cultivate their potatoes as formerly, choosing the soils and applying the manures which hitherto were found best adapted to their culture; forgetting or overlooking the rot altogether, and disregarding the nostrums recommended for its prevention: the potato won't bear doctoring.

The weather which produces rot is either a severe, continuous drought of some weeks' standing, thereby preventing the natural growth and maturity of the potato, for the want of moisture, or very hot weather, bringing the potato to a premature ripeness, succeeded by wet, sultry weather, unnaturally *spring-like*, which provokes the tubers to perform the functions of seed, thereby dissolving the connexion between them and their vines: the vines die; the roots undergo an incipient fermentation preparatory to decomposition; the operation of budding or growing is checked by the natural autumnal temperature that at length prevails, which arrests the potato in its work of producing; and hence its deterioration. The latter condition of the weather is the prevailing cause of the rot.

As to a severe and continuous drought, my own experience points to that of 1838. That season I had a five-acre patch in with potatoes, which did not pay for the trouble of taking them out of the ground. They were small, ill shaped, bad tasted, poisonous, spotted, and black-hearted, and rotted in the cellar. Potatoes that season sold as high as $1 25 and $1 50 per bushel; not a bushel of good potatoes at market except those imported. Then as to dry, hot weather, succeeded by wet, close, over spring-like temperature, the season of 1843 is in point. I took more than common pains that year to produce a surpassing yield—equal, at least, to my famous crop of the preceding year, which was over 440 bushels to the acre, field culture. My seed was in part from those fine potatoes, and in part from some very large, sound potatoes imported from the State of Maine. On taking out the crop in October, the whole was found to be very badly diseased. The weather from the latter part of June, till the beginning of September,

was mainly hot—occasionally very hot and dry. September set in with warm rains, thunder storms, and gusts; the moisture and closeness unprecedented. Fruit trees blossomed, as well as many flowering trees and shrubs. I recollect making a large collection of flowers from the magnolias, some of which I sent to the editor of the "Pennsylvania Inquirer." My potato vines looked green and healthy; when, all of a sudden, they changed color, drooped, and died. I think if I had taken out the potatoes at that juncture they would have proved comparatively good; but they were permitted to remain quite a month after, when they were found badly rotted, tainted, and almost worthless.

Now, then, as to the epidemic. In 1844, I planted some four to five acres of potatoes, *the seed of which was principally culled from the diseased crop of* 1843. I planted, also, at the same time, in the same field, other seed of very sound potatoes brought from Maine. They all did equally well. *I could discover no difference.* The crop was a very fair one, and the quality unexceptionable in every respect. I do not mean by this to encourage the planting of diseased or doubtful potatoes. It is safer to plant sound and perfect ones; but I am strong in the opinion that there is no danger of a diseased or tainted potato *producing* a diseased or tainted potato. It may, from its want of vitality, be very unproductive, make feeble shoots, the same as decayed potatoes from on shipboard, after a long voyage; the heat and moisture of the vessel's hold having caused them to send out enormous shoots, impairing their vigor, and producing rot. Such potatoes, when planted, never produce well as to size and quality; but I have yet to learn that they ever produced a diseased potato.

Much has been said of potatoes becoming feeble and sickly from long and constant planting. There may be something in this; time will not permit me to examine it now. I have, however, numerous sorts of seedlings produced from the apples of my very fine crop of 1842. I shall take occasion to present you with a few to send to some of your friends abroad.

By this you will see that I can offer no remedy or preventive for the rot. He that tempers the winds to the shorn lamb can only control it. Should it again visit us, we can only exercise our best judgment by taking out the potatoes early—as soon as they exhibit signs of decay; laying them in thin layers, in dry, cool situations, or otherwise, as circumstances may justify. Let the farmers go on and plant in confidence, as their best experience may teach, trusting, for the abundant yield, to that Providence who sendeth the early and the latter rain.

Very respectfully, your friend and obedient servant,

JAMES GOWEN.

William Peter, Esq.,
Her Britannic Majesty's Consul, Philadelphia.

APPENDIX No. 6.

POTATO ROT IN EUROPE.

From the (London) Gardeners' Chronicle and Agricultural Gazette, of Aug. 16, 1845.

POTATO BLIGHT.

A blight of unusual character, which almost invariably affects the potatoes in this island, having been the last few days brought to my notice by several gardeners, I am induced at once to lay before the readers of the *Chronicle* such observations as I have yet been able to make on the subject, being desirous to know whether this plague be in reality, as it is here supposed, an entirely new one; whether it be local or general in other parts of the Kingdom; and principally, and lastly, what is the best course to pursue where it has made its appearance. The first appearance is a dark spot on the margin of the leaf, which withers the leaf, and spreads rapidly to the stem. The discoloration soon extends along the stem in the course of the vessels, and the whole plant rapidly becomes black, so that within three days after a plant is attacked it has become totally destroyed. With this appearance in the upper part, there co-exists a fatal change in the tubers: they become likewise spotted, at first, near the eyes on the upper surface; the cuticle separates, the substance becomes friable, and the change soon spreads throughout the whole potato. All situations, whether high or low, and whatever the nature of the soil, appear to be equally visited. The attack on the plant appears invariably to commence in the leaf, and not in the stem; and the spot commences at the margin, corrugating the leaf as it spreads. It is black on the upper surface, but on the lower surface, though black in the centre, it is whitish or gray in the margin, but neither minute insects nor fungi can be seen with a strong lens. That, as regards the green portion, the leaf is affected before the stem, I am quite clear; but the question arises, is the disease in the root and tuber the cause or consequence of the above change? I believe the latter to be the case, from all the instances I have examined; and in one instance in particular, where from ripeness the greens were on the point of withering when attacked, the affection did not at all extend to the roots. The change which takes place in the tuber is as follows: The first appearance resembles a severe burn; the root turning gray or ash-colored, and the cuticle coming off. When the change has become considerable, I am told that the vegetable has a pungent and nauseous taste, and it is reported to have been injurious to pigs; but on this point I have no certain information. So universal is the evil that the consequences are likely to be very serious, as, in a long journey on horse-back, I have this day carefully watched every potato ground as I passed along, and not one could I see uninjured

T. BELL SALTER, M. D.

ISLE OF WIGHT.

From the Mark Lane Express

But the great distress of the farmer is the total failure of the potato crop. Up to Monday last the promise was the most abundant ever known—the

whole looked healthy. In one night the mischief was done; the whole of the stalk and leaf turned as black as your hat, and the potatoes rotted in the ground. This is a sad state of things; and the general opinion is, that sufficient will not be saved of the crop for seed. A friend of mine has just returned from a visit in France. He says, in the whole of Normandy and Brittany the crop is a total failure—the damage done in one night. They attribute it there to frost. Here the farmers say that after heavy rain, and so long continued, and hot weather set in, the ground heats the potato. I believe this to be true, as it begins to blacken at the foot of the stalk. It has been very hot to-day; the farmers fear, from the great heat, the grain will shrivel much.

GUERNSEY, *August* 16.

From the Gardeners' Chronicle, August 23, 1845.

A fatal malady has broken out among the potato crop. On all sides we hear of the destruction that has overtaken this valuable product, excepting in the north of England. In Belgium, the fields are said to have been entirely desolated. There is hardly a sound sample in Covent Garden market. In fact the murrain seems to have been transferred from cattle to potatoes.

Dr. Bell Salter last week called attention to the symptoms of the disorder as manifested in the Isle of Wight, and we this week print many other communications on the subject, concerning which we have very numerous letters. The disease consists in a gradual decay of the leaves and stem, which become a putrid mass, and the tubers are affected by degrees in a similar way. The first obvious sign is the appearance, on the edge of the leaf, of a black spot, which gradually spreads; then gangrene attacks the haulm, and in a few days the latter is decayed, emitting a peculiar and rather offensive odor. When it is severe, the tubers also decay; in other cases they are comparatively uninjured.

The cause of this calamity is, we think, clearly traceable to the season. During all the first week of August, the temperature has been cold, from two to three degrees below the average; we have had incessant rain, and no sunshine. It is hardly possible to conceive that such a continuation of circumstances should have produced any other result, all things considered.

The potato absorbs a very large quantity of water. Its whole construction is framed with a view to its doing so; and its broad succulent leaves are provided in order to enable it to part with this water. But a low temperature is unfavorable to the motion of the fluids, or to the action of the cells of the plant; and, moreover, sunlight is required in order to enable the water sent into the leaves to be perspired. In feeble light, the amount of perspiration from a plant is comparatively small; in bright sunshine, it is copious; in fact, the amount of perspiration is in exact proportion to the quantity of light that falls upon a leaf. At night, or in darkness, there is no appreciable action of this kind. During the present season, all this important class of functions has been deranged. The potatoes have been compelled to absorb an unusual quantity of water; the lowness of temperature has prevented their digesting it, and the absence of sunlight has rendered it impossible for them to get rid of it by perspiration. Under these circumstances, it necessarily stagnated in their interior; and the inevitable

result of that was rot, for a reason to be presently explained. If the first days of July had not been suddenly hot, it would not have happened; if we had had sunlight with rain, it would not have happened; and perhaps it would not have occurred had the temperature been high, instead of low, even although the sun did not shine, and rain fell incessantly. It is the combination of untoward circumstances that has produced the mischief.

Although we first see the symptoms of the disease in the leaves, and then in the haulm, yet we believe that it commences under ground, in that part of the haulm which is just above the old set. There, water collects the most; there, the temperature is lowest; and there, the old set itself, acting like a sponge, and itself decaying, feeds the live stem with semi-putrid matter.

It may be urged, perhaps, in opposition to this explanation, that potatoes thrive very well in districts whose summers are usually as unfavorable as this has been; as, for example, the cold parts of Scotland. And that is doubtless true. But in those climates the potato grows slowly; its tissue becomes thoroughly organized as it proceeds, and it is not liable to be acted on by accumulated moisture. There, no predisposing cause exists. But in England, the potato was predisposed to take the disease which is destroying it, by the unusual warmth of the beginning of July suddenly succeeding a period of cold, ungenial weather; at that time the temperature of the soil near London was between 60° and 68°; the potatoes grew excessively fast, their tissue was soft and unconsolidated, filled with azotized matter, as all such tissue always is, and peculiarly liable to run into a state of rottenness. They have never had the means of consolidating their tissue, but the tendency to putrefaction has continued almost unchecked ever since the sixteenth of July, when the cold and unfavorable weather first began to declare itself; the tendency has increased, and at last accumulated so far as to terminate in absolute decay. This is strikingly illustrated in those cases where, in consequence of the badness of the soil, the potatoes made no considerable progress in July, but continued stunted and unpromising, notwithstanding the warm weather. In such places—and we have one beneath our eye—not a trace of rot is to be found.

The mischief, although very general, is not universal. It is, however, appearing in some of the gardens around London; and it has begun to attack a field near ourselves, on the London clay, which, as it offers what we think a good illustration of the way in which the potato crop is affected by such a season as this, we shall proceed to describe. The field is bounded on two sides by a deep ditch, newly cut, and on the others by a hard roadway. It was last year a pasture. During the autumn, it was trenched three spit deep, but in such a way that the turf was turned down about a spit below the surface. It was planted partly in December, and partly in April. Here, on this cold soil, lying on a dead level, with scarcely any means of effectual drainage, the potato murrain might have been expected; and here it has made its appearance, but not to any great extent. Symptoms are discoverable here and there; but only in one place has the haulm actually decayed. That place was a low part of the field, and had been made up with road sand and similar rubbish, very retentive of water. Elsewhere the leaves are yellow—an invariable symptom of an over-cold and damp land. In situations better drained, as, for example, all along the ditch, the foliage is green, vigorous, and healthy.

Here, then, we find what we look upon as good evidence of the justice

of the opinion which we have ventured to express as to the cause of the pestilence in question. The whole crop is not attacked, because, although the land is ill-drained, yet the recent trenching, and the decaying turf just below the potatoes, have been sufficient to carry off the water. Where it was otherwise, (that is, where road sand was thrown down to some depth, and consequently the turf drainage annihilated,) there, and there only, the disease appears.

We should be much obliged to our correspondents if they would examine closely into the state of the ground where their potatoes are growing; for if water lodging in the ground is the cause, then thorough drainage will be the preventive in future years. That excessive wet, in a cold soil, is the cause, connected with the other circumstances already alluded to, is, we think, conclusively proved by potatoes from Bennenden, in Kent, which are half rotten. Now these potatoes had already burst, from the quantity of water they contained; but the wounds so produced had healed up, and now they are perishing from murrain. We infer, from these examples, that at Bennenden, even in the warm and comparatively sunny days of July, the tubers were injured by excessive wet; but, on that occasion, it did not end in putrefaction: that form of the disease did not come on till the cold, gloomy, watery days of August, and after the forced growth of July.

Since writing thus far, the post has brought a fresh supply of information—among which are letters from Dr. Bell Salter and Mr. Gifford, a Jersey gentleman. The former states that the disease has become modified, and ceases to run its course so rapidly. During the last week we have had a little sunshine, and a cessation of rain. Mr. Gifford's remarks coincide with the views above expressed.

As to cure for this distemper, there is none. One of our correspondents is angry at our not telling the public how to stop it; but he ought to consider that man has no power to arrest the dispensations of Providence. We are visited by a great calamity, which we must bear. At the same time, although it is not within human means to alter the course of the seasons, or to prevent the maladies attendant on them, yet prudence may perhaps suggest some alleviation of the evil. Should we have fine weather, the disease will probably disappear; should rain and cold continue, it will spread. In the latter case, the only thing to be done will be to dig up the crop immediately. Much loss will be thus sustained, and the quality of late potatoes will be bad; but the loss will be less than to let the potatoes all rot in the cold ground; and we conceive that some of the crop will be eatable, though not what could be wished. We find that, in some districts, the haulm has been mowed down by way of stopping the mischief, (and this may be judicious as a temporary expedient;) but we fear that no real advantage can be expected from any other course than digging up, drying, and sorting over the produce.

Although the potatoes taken up thus early will suffer in quality from their unripeness, yet even this evil may be partially remedied by putting them in heaps consisting of alternate layers of dry earth and tubers. In such a situation it is probable that no further decay will take place; and it is certain that the ripening process will continue to proceed, although less effectively than under natural circumstances. We may add, that such late potatoes as we have examined are much more advanced towards ripeness than might be supposed. They are already very full of starch, and their gummy matter is disappearing fast.

We should be very glad to know how far the observations of others confirm or contradict our suggestion, that thorough drainage prevents the appearance of the potato murrain. We should also wish to know whether it has appeared in the cold parts of the Kingdom. If not, the potato harvest in the north bids fair to be as profitable to the gardeners there, as it is ruinous to those in the south; and holders will do well to ascertain the value of their potatoes in London before they sell.

As to the fitness of decayed potatoes for food, we doubt extremely the prudence of using them, if the disease is more than skin deep, so that it may be pared away. Putrid matter of any kind (or even matter approaching putridity) is unfit for being introduced into the stomach, and has very often proved fatal. The Belgian police, acting upon this well known fact, have been destroying the decayed potatoes in the public markets of Antwerp; and they have acted wisely.—[*Editorial.*]

From the Gardeners' Chronicle, August 23, 1845.

I am sorry to say that the pestilence mentioned by Dr. Salter, which has seized the potato crop in the Isle of Wight, has also done a deal of damage to our potato crops in the island of Jersey; but, thank Heaven, not as yet to the extent mentioned by your correspondents. About three weeks ago I first perceived the mischief in a potato field of mine, (about an acre,) and I at once attributed it to the easterly winds, and took no more notice of it; but a few days after, seeing the fields of my neighbors in the same plight, and having taken notice that those parts of the fields which were most sheltered from these winds had not escaped the disease, I concluded that it must be attributed to other causes, as yet unknown. Having remarked that the places most affected were under the hedges and in the coldest parts of the fields, where the sun had less power, and that those parts where the sun had full play the crop had suffered less, I think that it will be found, after a serious investigation, that a great deal of the mischief must be attributed to the very wet season, and to the cold nights which we have had all through the summer. With us, the tubers have not yet suffered. I dug a few roots the other day, and though unripe, they were found very good. So far as the leaf and the stems go, the disease seems to be the same as mentioned by Dr. Salter, and it seems to be universal through our island.

RICHARD GIFFORD.

JERSEY.

P. S.—I have potatoes in a field (hilly ground) where the sun strikes all day long, which shows no symptom of the disease; and this, according to my opinion, goes far to prove that the state of the atmosphere through the summer has had a great deal to do in bringing the dreadful calamity complained of.

R. G.

The perusal of the article on potato blight induces me to trouble you with a few remarks on the subject.

About ten days ago, I first noticed a brown spot or mark on the margin of some of my potato leaves. On examination, I also found spots of a similar color on the stalk; but on trying the roots or tubers of several sorts, I could find no perceptible disease or injury. This morning I have been induced to examine a variety of sorts in different situations and soils: 1st, ash-leaved kidneys; 2d, Julys; 3d, Fox's or Cox's seedling; 4th, peeler; 5th, Lancashire red; 6th, Canada pine; 7th, a potato kindly sent me by Dr. Henderson; and, 8th, mangel-wurtzel. All the sorts, in all the situations, appear to be similarly affected, except number 8, which has up to this day almost entirely escaped, though the fatal spot is occasionally perceptible on the leaf, the plant growing very luxuriantly. I may add that every plot in my allotment field, under every variation of culture, is in the same sad condition, and the neighboring farmers make a similar report. I observe here that the centre of the plots has been first affected; that haulm smells remarkably like new made hay, and the whole of the mischief above ground is done in the course of three or four days. I cannot, however, ascertain that as yet any injury whatever has been done to the tubers in either of the sorts I have mentioned, whether early or late. It is true that I found a few of my Julys slightly diseased on the outside, but not more so than frequently happens, and certainly not sufficient, *per se*, to attract notice or remark. My gardener calls the disease the dry rot.

PETWORTH.

From the Gardeners' Chronicle, August 30, 1845.

Another week has added little to what we know about the *potato murrain*, but that little is important.

In the first place, we appear to have been right in supposing the distemper to have confined its attacks mainly to the southern parts of the country. We hear nothing about it in the north, and Mr. Berkeley writes that he cannot find a trace of it in his part of Nottinghamshire.

As we anticipated, its virulence, too, seems to have abated, and we feel warranted in the hope that the worst is over; that is to say, that no more tubers will be attacked than those in which the distemper has already manifested itself. But we fear that their number is far beyond what is imagined. It is certainly greater in the places we have personally inspected than we anticipated. We have this morning been examining a field in which the pest has assumed a comparatively mild form, and we find that among bread-fruits six in nine, among Jersey blues all or nearly so, and among Dr. Henderson's black Scotch potato a large proportion, indicate unequivocal signs of its presence. It is not, however, easy to discover it in the dark-colored potatoes without cutting them, and therefore we speak doubtingly as to them. In the bread-fruits it appears in the form of dull, livid patches or specks, looking much like contused flesh, or, to use a familiar comparison, like the skin round a blackened eye when it is beginning to recover its natural color. This appearance is, however, not to be seen plainly, unless the potatoes are washed. A little earth, or even the skin adhering to the potatoes, hides it; and this deceived us on our first inspection.

We fear that every potato which is affected, in ever so small a degree, is lost; for we have too much reason to believe that the disease is of the nature of a canker, eating down into the flesh. At least, we find that pota-

toes which a week ago were taken out of the ground and placed in the dark, on the floor of a dry stable, are infinitely worse than they were. It is this which leads us to suppose that every potato, in ever so small a degree touched, will rapidly decay. This is unfortunately rendered the more probable by the appearance of a kind of mouldiness, mentioned elsewhere by Mr. Berkeley, which appears on the cankered spots, and which will no doubt add greatly to the mischief, though we are quite persuaded that it is the consequence and not the cause of it.

The cause is, we think, beyond all doubt that which we last week suggested—excessive wet, and a low temperature, acting upon the debilitated organization of a haulm, which sudden warmth had forced into preturnatural vigor. Some of our correspondents think, indeed, that the spot in the leaf is the cause ; that it is cold, or some other thing, acting upon the foliage, which has caused a disease which spreads downwards. If we may be certain of any thing, when considering the obscure phenomena connected with vegetable disease, we may be certain that this is not so. The evil always begins next to the old set, and under ground ; then the haulm becomes brown, and rots. The spots in the leaves are merely the symptoms of the under-ground malady. It is only necessary to take up a few patches of sound and unsound potatoes to be convinced of this. In fact, in some places it will be found that when the attack on the stem beneath the ground has been slight, no indication of its presence is traceable in the foliage. We suspect, indeed, that in every case the potato straw has been damaged above the old set ; for where potatoes are perfectly sound they now seem to have little communication with the parent—to have ceased growing ; and the sound parts of the haulm are here and there throwing out a fresh crop of potatoes, now about a week old.

Of course the grand point to settle is, what can now be done? When the mischief is severe—nothing. We should abandon the crop to its fate, and plough up the field if time will permit. This is, however, not very important, because we do not apprehend that the rotten potatoes will leave any contagion in the ground, *unless it be for another crop of the same kind.* We certainly should not like to grow potatoes in such fields next year ; otherwise, we presume that the decayed tubers will act like any other decayed matter, and manure the land.

Is there any gain in mowing off the haulm that remains, when the disease is less severe ? If we thought that such haulm was at all in communication with the potatoes themselves, we should say, cut it off by all means. But the cords of union are apparently broken ; and if so, there seems at first to be no advantage in removing it. If, however, what remains of the foliage is still in communication with the sound potatoes, it will affect them, and therefore, perhaps, it is a wise precautionary measure to mow the haulm down. Its remaining can do no good ; and at all events, cutting it off will do something towards enabling the ground to become dry.

* * * * * * * * *

Upon the whole, we suspect that the potato growers will be compelled to leave their crops to their fate until harvest is more advanced.

Can the decay be arrested in those potatoes in which it is now manifesting itself? That is another and most important inquiry, to which the novelty of the distemper renders it impossible to give any thing more than a conjectural answer. For ourselves, we fear that external applications, like

lime, whitewash, or charcoal powder, will be inefficacious—for this reason, that the disease cuts into the core of the potato, and the action of all such substances, if of any advantage whatever, will be merely on the surface.

* * * * * * * * *

Suppose that infected cankered pieces were cut out, and the wound dressed in quick lime or whitewash; would that stop it? The plan may be tried. One thing, and one only, strikes us as a probable remedy, and that is, destroying the vitality of the potato by driving off its moisture. This may be done by kiln-drying, and we fear by no other means. It might be worth the while of those who have the means to try this experiment, and if it should produce any advantage this year, it may be useful to know of it in case we should again be exposed to such a melancholy visitation.

* * * * * * * * *

If it is any consolation to potato growers to know that they do not stand alone in their misfortune, we can add that acres of pickling cucumbers have gone off in the same manner, from the same cause, and with the same symptoms. We have now before us a gourd, whose roots and main stem seem to have perished about a month since; but the plant has not died, because the succulent stems have thrown out fresh roots from the joints. The same thing is happening to potatoes, but, from the lateness of the season, we fear to no practical purpose. * * * [*Editorial.*]

We find the potato crop in this neighborhood (Havant) is also affected, but not to so great an extent as your columns describe the injury to have been in the Isle of Wight. On digging up the roots, the tubers nearest the surface of the ground are, in general, the only ones affected, though in some plants the injury extends throughout the potatoes belonging to that root; but where it does not so extend, the rest of the tubers appear perfectly well grown and healthy. It certainly is not a disease of the root, but appears to be the consequence of injury done to the haulm and leaf. Is not the cause to be attributed to the severe winds and white frosts experienced a short time ago injuring all above the ground, and preventing the vessels of the plant from drawing up the juices from the roots, and these tubers, full of stagnated fluid, immediately decaying? Supposing this to be correct; I have practised the cutting off the haulm, with a reaping hook, about one inch between the earth, into where the frost and winds might be supposed not to have injured the vessels of the plants, hoping by these means to induce them to bleed, and thereby relieve the tubers of their stagnated fluids. This is not capable of curing the injured; but it might probably prevent other tubers from becoming affected. I also suppose that if nature form a leaf from this proceeding, the potato will certainly be saved; and if a leaf be not formed, then, by leaving the potato an extra time in the ground, the tubers not affected might ripen and become wholesome food; which they cannot be if not allowed to fully ripen.

H. S.

I have reason to believe that you are perfectly correct in ascribing the potato disease to excess of moisture in the plant, consequent on the late

continual rain and absence of sun-light, and that it has been greatly aggravated by a too retentive soil. Our garden is, from its locality and the nature of its sub-soil, so thoroughly drained, that in most summers we suffer excessively from drought; and, though the haulm of the potatoes grown in it is more or less affected, the tubers themselves are comparatively uninjured; while in a piece of ground apart from the garden, having a stiff clayey sub soil, the disease has been much more violent. I am also inclined to agree with you in connecting with the disease the sudden heat of the end of June and beginning of July, as in a piece of Dutch potatoes, which was not planted before that time, scarcely a symptom of the disease is perceptible. I may also remark, that, in the garden, the disease originated in a part of the potato ground which is shaded by a large apple tree, so that for a time the outline of the blackened haulm exactly represented the shadow of the tree.

OXON. E. J.

I have this morning received from Dr. Montagne, of Paris, some leaves affected with the mildew, together with an admirable analysis of it, and it proves to be a minute mould of the genus Botrytis, very greatly resembling that which is so very common on the Shepherd's Purse, especially on those plants which are attacked by the white uredo. It is also allied to Botrytis destructor, (Beck,) which is occasionally a perfect pest amongst the different species of allium. I have seen whole beds of shallots entirely destroyed by it, and it is occasionally very prejudicial to onions.

The parasite of the potato does not appear to have been observed before by systematists, and differs in several particulars from those of the same genus which have been long known as attacking the leaves of various plants. Dr. Montagne purposes to call it Botrytis infestans, and will doubtless take an early opportunity of publishing his observations. He does not undertake to say that the spots on the tubers are owing to the ravages of the Botrytis, or whether two causes of disease co-exist. The primary cause is doubtless the continued wet, combined with certain peculiarities of soil. It may be observed that the dry rot in potatoes, so ably described by Martius, arose from the attack of a fungus of a very different structure from that by which the leaves and stems are attacked in the present instance.

KING'S CLIFF, *August* 26. M. J. B.

From the Gardeners' Chronicle, September 6, 1845.

Since I last wrote to you, I am sorry to say that the potato murrain has made its appearance in Northamptonshire and the neighboring parts of Huntingdonshire, and is spreading very rapidly, and will, I fear, do great damage unless the improved state of the weather checks the evil, about which I am not very sanguine. I have seen it on various kinds of soil, and on both early and very late planted potatoes; on some, indeed, which are now in full blossom. It is quite as virulent on well drained fields, whether the soil is bad or good, as on the cold, undrained clay of our forest land. The worst case that I have seen is in Huntingdonshire, on an

excellent piece of well drained land, but lying within a few yards of the river; not, however, subject to be flooded. I do not find that the tubers are at present affected; but the haulm is decaying very rapidly, and in every case the blighted spots are covered with Botrytis infestans, (Mont.) You will be interested to learn that the mould on the potatoes which you sent me is identical with that upon the leaves, and the same with what I have received from Paris. On making a very fine vertical section through the less diseased portion of the tubers, I find incipient plants of the mould in the more healthy cells; for, in general, the brown spots do not at first consist entirely of decayed cells, but still retain many in a tolerably healthy state. At a later period, probably, all the cells would be more or less altered. Those which are uncolored exhibit their usual appearance; but the walls of the diseased cells are thickened, and have a granulated appearance. Both in colored and discolored cells the grains of the fecula remain apparently unaltered, and are as sensible to the effect of iodine as ever. It is probable, therefore, that at least in an early stage of the disease the tubers would yield as good starch as those which are sound. There is not the slightest appearance of any processes upon the grains of fecula, as in the disease so admirably illustrated by Martius. It is the cellular tissue alone which seems to be affected. The cells immediately beneath the cuticle, especially where there is a depressed spot externally, are often impregnated with mycelium to such a degree that the pure white of the mycelium predominates, and the brown tint in a great measure vanishes. Even in this case I find the grains of fecula healthy and abundant. It appears, then, that the decay of the tuber is produced by the same cause which affects the leaves, viz: by the growth of a mould whose development has been promoted by the excessive wet. The parasite does not appear to have been observed before; but there is little doubt that it will now be found to be more or less prevalent in damp and ill-drained spots, even in the driest years.

The execessive development of the mould, and its consequent injurious effects, depending entirely upon the season, it will, beyond doubt, be impossible to find a remedy; nor does it seem, from what has been stated above, that even the best cultivation will insure exemption. It is greatly to be desired, that as such points are seldom if ever taken in hand by government, some of our agricultural societies would, from time to time, take proper steps to insure the best information possible as to the extent and circumstances of any plague like that which is at present so injurious. The most valuable facts are thus obtained upon the continent, when the commissions are properly instituted; and in some cases, as in that of the calamity by which the vines of France were for some time affected, such inquiries have been attended by the most beneficial results. It is impossible, from any number of independent documents, to arrive at the complete history of any disease like the present. A continued series of observations, conducted both by practical and scientific men, and thus embracing every possible point, and extending through remote districts, with the power of comparing individually the different phases it exhibits, or the varied circumstances under which it appears, can alone lead to any thing satisfactory. The expense, doubtless, would be considerable; but the utility, whether immediate or more remote, would be fully commensurate with the expense.

M. J. B.

King's Cliff.

In reference to your remark, that the disease commences under ground, I must beg leave, though no physiologist, to doubt it. I have in very many instances split or divided the haulm from the blossom to the root; and in only two instances did I find any defect below the ground. Both these were in the Julys; the outside appearance was that of mildew; the stalk at the lower end, both above and below the surface of the ground, was dry, wiry, and scarcely flexible; but this occasionally happens in ordinary seasons. I have found only one instance of the disease having penetrated the haulm more than skin-deep, without destroying it; in this case, it assumed the appearance of a reddish-brown canker. My observations would not lead to the inference that well drained land has in any material degree escaped the scourge, and I feel fully justified in making the remark, from the very porous character of the soil around me, and my knowledge of the manner in which a large portion of it has been cultivated. It is a somewhat remarkable circumstance, that on Friday, the 8th of August, we had an unusual quantity of electricity in the atmosphere, and lightning from all parts of the heavens. We had also three nights consecutive frosts at that time; and on Saturday, the 9th, the disease was first noticed in this neigborhood. I do not pretend to infer that electricity has introduced this disease; but, as the coincidence occurred, I have thought right to mention it. I am disposed to attribute the mischief to the cold, wet, and generally ungenial season, and perhaps to our want of sufficient knowledge of the habit of the potato. Is there any thing in the nature of the mangel-wurtzel potato different from that of other kinds, or is my observation in its favor a solitary testimony?

H. H.

Petworth.

—

The other day my attention was arrested by a black-looking patch in my garden, and on close examination I soon discovered all the symptoms so much complained of, and which seem to identify it with this almost universal disaster; and which I must, at once, pronounce to be neither more nor less than mildew. I may of course be wrong in my assumption: this, time must prove; but mildew in general has such distinct features, that long experience in such matters can hardly be mistaken. I feel astonished (assuming, for the moment, that I am right in the opinion) that this had not been discovered before. In the specimens which I have examined, in three distinct stages, the points all agree with those related from the southern parts of the country. In the first stage, the black spots look as though hot coals of small dimensions had been laid on given points.

Had it not been for the unambiguous character of the second stage, I should have fancied that it was a parasite belonging to the genus uredo.

The second stage, if I may so divide the matter, appears to be the rolling or curling up of the leaves all over the plant, exhibiting thereby the back of the leaves; and the whole plant, at this period, appears white with mildew.

This is soon succeeded by a general blackness and rottenness; the leaves are totally perished, the stem denuded, and the rot proceeding so rapidly that portions of the stem soon become a pulpy mass. I cut into some tubers this morning, which belonged to roots nearly in the third stage, and I found the end discolored in a considerable degree, more especially at that point where the string forms a junction with the potato; this is just what I had

expected. The potato plant, abounding so much in watery matter, appears to furnish a better subject than most plants for such rapid and astonishing effects of destructive fermentation, or decay of the whole system.

It is pretty clear to me, from the circumstance of its attacking the crop in the more southern parts of the island first, as also the earliest kinds in general, that this mildew requires a highly elaborated state of sap in the plant to facilitate its progress. Thus it is with the pea mildew. If the general elaborations of the plant move, through the influence of heat and light, at a greater rapidity than can be sufficiently supplied by the ascending current, the mildew spreads with great rapidity. I think it likely that the incessant rains, accompanied with such low temperature, have been quite sufficient to warrant the assumption that the fibrous action of the root has been much paralyzed. It is certain that the atmospheric conditions have not been as in ordinary summers. I take it for granted, that whatever arrests the secretions of the potato robs the tuber of a portion of accretive matter, and consequently of keeping as well as nutritious qualities.

R. ERRINGTON.

Oulton, Cheshire.

I have a piece of ground of about an acre and a half planted with potatoes. The soil is a fine hazel loam, and the field slopes towards the south. Most probably potatoes were never grown here before. I had the ground trenched 18 inches deep, in the autumn, and thrown up in hacks. The potatoes were planted in April, with more than a usual quantity of stable dung placed over the sets; so that they had every advantage of both drainage and manure. The plants were very promising until within the last three weeks, when an appearance of premature ripeness became visible. At this time—Monday, September 1st—the early Shaws have but little green remaining on their tops; the pink-eyed kidneys not much more; and the later kinds, though not withered, are as brown as they were last year at the end of October. I cannot find, in any case, that the stems have rotted, but they have turned black, and the foliage has quite disappeared. I dug up three rows of early Shaws this morning, and the produce has proved better than I expected. The quantity is very small, when the expensive mode of culture is considered; but the proportion of unsound tubers is not large. This unsoundness appears most on the potatoes nearest the surface, and presents a dirty brown color, which extends, in various degrees, into the structure of the tuber. The most remarkable circumstance is, that this discoloration is not associated with rottenness, since the part affected is as hard and as juicy as that which is sound. I observed, also, that one potato which had received a wound in the discolored part, was fast healing over, which, I presume, could not be the case if rottenness had commenced.

H. BURGESS.

The Bury, Luton, Beds.

A warm aspect and a well-drained soil seem to be no safeguard from the attacks of the potato plague, for I happen to know of an instance where ash-leaved kidneys, from the same seed, were planted on a dry, sunny bor-

der, in a private garden in this city, and on a cold, shady, damp border in the same garden; yet the potatoes in the warm and dry aspect are destroyed, while the others, under the shade and drip of the trees, have shown no symptoms at present of being injured. In the case mentioned, however, I cannot help suspecting that the latter will suffer by and by; the disease appearing to me to be in the nature of a fermentation or decomposition, which, when once induced, is encouraged and promoted by the presence of warmth. This view of the case also serves to explain the reason why the southern counties have been the first to suffer from this alarming desolation, and why the northern parts of the country may look out for its appearance amongst their crops before many days.

W. MARSHALL.

ELY, CAMBRIDGESHIRE, *September* 4.

I cannot agree with you in attributing the disease which affects the potato crop to excessive moisture. In the first place, is it a fact that the earth has been saturated with moisture to an unusual degree? Taking the deficiency of moisture during last year, I imagine not. But with respect to the potato crop, as far as I can perceive, there is not the slightest difference between those grown in light and heavy soil. In the neighborhood of this place there are acres on the light ferruginous sand, on the edge of the cliffs, and consequently thoroughly drained, on which there is not at this moment a plant that is not infected. What the cause may be, I do not pretend to say; but I do not think it can be traced to the excessive moisture of the summer. Had this been the cause, would not the decay have been more gradual? Would the destruction of the plant have been so very rapid? It is not merely wet that has done this mischief; it is the combination of cold and wet, acting upon very tender tissue. About that we entertain no doubt. We inquired as to drainage, rather than asserted anything about it, as you will perceive if *our* remarks are again perused.

W. E. H. SANDOUN.

ISLE OF WIGHT.

In the description given by Dr. Salter I have nothing to add, as I consider it very correct; but I confess that my observations differ from that gentleman as to the part in which the disease first takes its origin. He thinks it a kind of blight, beginning in the leaves and stems, extending downwards, and finally affecting the tuber. I confess my inability to explain satisfactorily what the real nature of this disease may be.

Dr. S. seems to think that we must trust the microscopical observations to discover a parasite on the plant. I am not aware that the disease which, when occurring in the animal world, is termed gangrene, or mortification, can be correctly applied to the vegetable kingdom, otherwise I should consider these brown spots to be incipient mortification, and that, as the effect of this condition, the death of the leaves and stem follows. A circumstance, accidentally discovered, seems to support this view. Previous to the appearance of this disease in any of the potatoes in this neighborhood, I was using at table some ash-leaved kidneys, of excellent quality, and so ripe that from natural decay the haulm was withered. A small quantity

of them, intended for seed, were left, and in a few days more, upon digging them up, great was my disappointment in finding them all more or less affected with this disease. Now, in this case there was not any portion of the plant above ground which could be at all affected by blight, or any other state of the atmosphere.

I am, therefore, disposed to suggest whether the disease is not one primarily affecting the tuber, and probably the effect of continued wet and cold, together with an absence of solar heat and light, whereby the chemical changes necessary for the formation of starch, albumen, and other inorganic products, have not been produced in the proportions necessary for assimilation. Chemical analyses of the tubers, thus affected, can alone prove how far this view may be a correct one.

* * *, M. D.

Eastbourne.

From the Gardeners' Chronicle of 13th September.

Having examined the tubers infected with the prevailing disease, I have scarcely a doubt left upon my mind that it is that moist ulceration (*gangrena saniosa*) to which all bulbs and tubers are liable, if exposed to ungenial circumstances at the time when their ripening processes should commence. At such time they require increased degrees of heat and dryness, and if subjected to the opposite extremes, as the potato has been this year, they for the most part ulcerate and decay. Take the tulip and hyacinth for examples. In confirmation or refutation of this opinion, I have instituted researches, which I hope to conclude in time for publication in the *Gardeners' Almanack* in November next; but they have extended sufficiently already to remove almost every doubt from my mind. If the July and August of next year are dry and warm, I do not hesitate to prophecy that there will be no potato murrain, and I think no preventive measures necessary beyond avoiding planting on plats of ground which have borne infected potatoes this year.

G. W. JOHNSON.

I learn, by letters from several foreign friends, that the disease which now affects the potato crops in the channel islands, and in several parts of England, is universal in Belgium, and almost all through France; and as Professor Morren, of the University of Liege, has described the malady, and the remedy to be immediately applied, I have seized the first moment of leisure to translate part of a letter which he has inserted in the *Independence*, of Brussels, for the benefit of those whom it may concern. The real cause of the disease is a mildew fungus, which scientific men class under the head of botrytis, but which the farmers will easily distinguish, and will name a spot, scorch, or burn. Some will attribute it to humidity, others to dry winds, to insects, &c. Nevertheless, it is of consequence to know the real cause of this phenomena; for the knowledge of it puts the farmers on the road to diminish or destroy, if it is possible, the evil. The professor has for several days followed the progress of the disease in several potato fields, and has come to the following results:

The malady decidedly commences by the upper part of the leaves; in

several instances he has seen the flowers and the seed-vessels first attacked. A part of the green tissue loses its color, and becomes yellow; the spots soon after become gray, and it is always on the under part of the leaf, or on the seed vessels, that the next day, or two days after the leaf has turned yellow, you perceive the formation of a white down. The microscope shows that this down is formed by a fungus which fructifies between the numerous hairs garnishing the under parts of the potato leaf. This fungus is extremely thin; but it fructifies immensely, and reproduces itself by millions. The professor, after having given a minute detail of the size, &c., of this fungus, concludes this part of his letter by saying: "Farmers will tell me that this is a very small body to cause such immense ravages; but I will answer, that the itch is not a malady less to be feared, because the acarus which causes it is a microscopic object. It is after the leaves have turned yellow, and the botrytis has made its appearance, that the stem is affected. Here and there the epidermis turns brown or black; and when you follow, with the use of the microscope, the infection, you soon perceive that it is by the skin that the stem is attacked. The morbid agent carries its action from the skin to the epidermis; and though you do not perceive fungus on this last part, it is not the less struck with death. For those who have a few notions of vegetable physiology, these effects are easily explained. The sap, modified in living juice, in vegetable blood, forms itself in the leaf, and descends through the skin in the stem and roots.

There the sap, being sickly, deadly, carries the poison from the leaf into the stem and kills it.

The fact is, that as soon as the black spots are seen on the stem, the leaves dry and die, and, struck with death by a poisonous mushroom, they fall, unfortunately, to deposite in the ground the germs of the poison. The infection soon descends into the potato, and, if the malady follows its natural course, it is soon affected with the gangrene; it turns brown or yellow, sometimes gray and dark, is soon spoiled, and the smell is so disagreeable that the animals refuse to eat of them. The disease being now known, the attention of agriculturists ought to be turned to diminish, as much as possible, the evil; because it is well known that all diseases which affect the corn crops, &c., once introduced into the country, remain and propaagate more and more. This year the epidemic seems to be universal; the germ is everywhere; and if a remedy is not immediately applied, the crops will be affected next year, and then it will become more difficult to extirpate the evil.

First, when the potato haulm is infected with the disease, mow it down, and immediately burn it. Second, act in the same way in potato fields that seem to have escaped the infection; for, though they may appear so to the eye, yet they may not have escaped the disease. Third, the potatoes diseased ought also to be burnt. Fourth, the seed for the next year ought to be steeped, like corn, &c., with lime, sulphate of copper, and common salt, diluted in water, in order to kill the fungus, if any, on the potato. Fifth, the potato fields ought to be next year as far off as possible from those of this year. Sixth, a mixture of lime, common salt, and sulphate of copper, to be powdered on the potato fields infected; this mixture having the power of destroying the poison left in the ground by the infected plants. For my part, I still hold to the opinion by me emitted—and I have seen nothing as yet to make me alter it—that the disease, in the first place, has taken its origin by the dampness and cold air which has been so prevalent during

the summer season. Since the warm weather has set in, (about three weeks,) the disease seems to have made but little progress; the tuber has been but partially affected, and, though swelling but little, seems to be sound and good. Nevertheless, the crop is a failure; averaging about half a crop.

RICHARD GIFFORD.

St. Peter's, Jersey.

Important to potato growers.—My attention has been given to the disease which has shown itself so extensively amongst growing potatoes. I find, in almost every instance, that the epidermis of the stalk, below the surface of the ground, is more or less in a state of decay, often disintegrated, and completely rotten. The leaves and branches accord with the state of that part below the ground.

The tuber beneath the outer skin is first spotted brown, (like a bruised apple;) these spots extend and penetrate towards the centre, quite changing the nature of the potato. Those near the surface are most injured. In some cases the lowest on the root are not at all affected, while the upper ones are useless. I should therefore expect that the longer the crop remains in the ground the greater the injury will be.

It seems, from the microscopic appearances, that the starch escapes injury for a long time after the skin and cellular parts are gone; and, as the whole of the nutritive powers of the potato reside in the starch, I should recommend that, wherever the disease has shown itself to any extent, the crop should be dug whether ripe or not, and the starch extracted by the following simple process: After washing the roots, let them be rasped fine and thrown into a large tub or other vessel; pour a considerable quantity of water, and well agitate and rub the pulp with the hands; all the starch or fecula will, from its great weight, fall to the bottom, while the skin and fibrous matter will be carried away by the water; wash the starch with one or two more waters, allowing it to fall after each washing; spread it upon cloths in a warm room, to dry. In this way about 20 pounds or 21 pounds will be obtained from every 100 pounds of potatoes; and it contains as much nourishment as the original roots. It will keep any length of time, and might be used with flour to make bread, pies, pudding, &c., as well as farinaceous spoon meal. This is much better than throwing away the diseased roots; and will furnish food for tens of thousands who might otherwise want it.

WILLIAM HERAPATH.

From the Gardeners' Chronicle and Agricultural Gazette, Sept. 20, 1845.

The attention of everybody is so absorbed by the *potato murrain*, that we should be wanting in our duty towards the public if we did not continue to advert to the melancholy subject. Not that we have much to add, either by way of advice or consolation; for the topics connected with the disease have all been already touched upon, more or less amply, by ourselves or our correspondents; and every week's experience satisfies us that there is little, if anything, to modify in the opinions we have ourselves already expressed.

The mischief is undoubtedly extensive to a most alarming degree. If we estimate the amount of loss at five-sixths, we shall hardly exceed the fact. In many places the crop is hardly worth digging; in others it is totally putrid; in many more, it seems to be spreading fast; and, as we mentioned last week, it has certainly broken out in Ireland.

"All my potatoes," says a correspondent near Dublin, "as well as those of the poor people here, are destroyed by murrain. Two days ago twelve acres were still safe; they are now gone."

Germany, Holland, and Belgium are in the same state as England. A dysentery, which has already appeared at Erfurt, is said by the *Gazette de Cologne*, to be traceable to the use of bad potatoes. The Belgium papers speak of cholera at Ghent, produced in the same way. Poland, according to the same journals, is so threatened by famine that the Prussian authorities, on the frontiers, have been obliged to take precautionary measures for keeping the starving population out of the Prussian territory; and finally, the authorities of some districts in France and Germany have either prohibited, or threatened to prohibit, the exportation of potatoes, lest there should be no seed for another year.

Such is the state of the case. It is useless now to speculate on the first cause of this murrain. Our original opinion was, we believe, correct—at least we have not at present seen anything to shake our confidence in it; and we find that, with the single exception of Professor Morren, the universal opinion among Belgian cultivators is the same as ours, except when meteors, electricity, and other unknown forces are appealed to. It is true that a minute fungus has made matters infinitely worse; but that is, we quite believe, a secondary cause.

The consideration of this part of the question may, however, be very well deferred. What we have now to look to is an immediate remedy for the evil.

From the very beginning we have pointed to dryness as the first means of arresting the progress of this disease. We even ventured to suggest kiln-drying, where means are at hand to employ it. We now learn from the *Belgium Moniteur* that a Dr. Varlez, of Brussels, has proved experimentally the efficacy of this process. The following is his account of his manner of proceeding:

"I caused an oven to be heated to the temperature of something less than 180° Fahrenheit. I placed in it diseased potatoes, both whole and cut, in order to be able to obtain an exact comparison between the parts baked and those not exposed to heat.

"After having been exposed to this temperature for a few minutes, a copious blackish matter oozed out of the potatoes, and they emitted a nauseous fetid smell. The corrupted matter came out, and when the potatoes were not too much diseased they became white again, and nothing remained of the rot except a slight brownish layer adhering to the skin, and easily removed by peeling. This layer is compact, and will permit nothing to pass through it into the interior. It loses, moreover, all power of injuring the sound parts that remain. As soon as potatoes are *quite dry* on the surface they may be removed from the oven. I found from 18 to 22 minutes long enough, when the temperature was such as I have described."

We are unable to say how long potatoes thus treated may be kept; but we imagine that there will be no difficulty on that head, if they are stored away in a perfectly dry place.

The question is, how far the cost will render the process of practical value.

Others recommend a steep of some kind as a means of stopping the mischief. This, if it will produce the effect, is the simplest process; but we are not aware of any positive result having been obtained by it. For ourselves, we have no great expectation of advantage from it. The mould fungus, which is now working so much havoc upon a debilitated constitution, buries its spawn in the tubers, far, we fear, beyond the reach of steeps; and, as to its seeds, why, they are finer than the motes in a sunbeam, and will insinuate themselves everywhere. We shall, however, be much obliged to any one who has tried any of the plans that have been proposed, for some account of the result. Mr. Prideaux has recommended chloride of lime and salt. Professor Morren also directs attention to the importance of salt as a means of repelling the disease. He recommends the tubers to be plunged in a steep composed of 54 lbs. of lime, $\frac{1}{4}$ lb. sulphate of copper, 7 lbs. of salt, and about 25 gallons of water. But, if the potatoes are to be eaten, the sulphate of copper must be left out; in fact, he recommends the steep for seed-potatoes only. There is one circumstance connected with the supposed action of salt, that deserves to be mentioned. In another column will be found a letter from a known correspondent, signing himself "Ambulator," who speaks of the healthy state of the potato crops on the coast of Somersetshire, although the murrain has committed its usual havoc beyond the reach of the sea influence. We also read in a Belgian newspaper the following statement:

"A person who has been travelling through Belgium, and especially the two Flanders, has remarked that on the coast, as far as the air is impregnated with saline particles, the potatoes are sound and perfectly healthy; but elsewhere, more inland, the epidemic is raging, and the potatoes become more and more rotten every day."

Are these coincidences, or do they indicate any protecting influence on the part of salt? The question is worth consideration. Has any one used salt in planting potatoes? and, if so, with what effect?

We find, however, that public opinion is turned more to the extraction and preservation of the *flour* which lies in the potato, and which constitutes an important part of its nutritive quality, than to any processes for saving the tubers by heat or steeps, the first of which is expensive and the last uncertain. It is a fact, that in spite of the ravages of the mould fungus, or the progress of putrefaction, the internal flour is as yet uninjured, and that it is practicable to extract it by very simple and cheap processes. This course is recommended by the members of the Hadleigh Farmers' Club, as will be seen from their resolutions, printed in another column; and we have received both from Mr. Berkley and Professor Henslow excellent samples of fine potato flour, extracted from the decayed potatoes. The latter gentleman found, that while half a bushel of sound potatoes yielded 4 lbs. 10 ounces of flour, the same quantity of diseased and decaying tubers furnished 3 lbs. 1 ounce. We have also received from a farmer at Hadleigh some good bread made by a laborer's wife from gleaned corn, and rather more than half potato flour, roughly prepared from very bad potatoes, and some sponge cake, worthy of Gunter, made exclusively of such flour, by Mrs. Patterson, the mistress of Hadleigh workhouse. In fact, the laborers' wives in Suffolk are setting in good earnest about the extraction of flour.

This being so, we think it important to direct particular attention to this

practical point; and, in connexion with it, we print the following valuable observations of Mr. Edward Solly, who is directing his attention to the chemical facts connected with the murrain:

Attention is now generally being drawn to the manufacture of potato flour, with a view to save some portion, at least, of the useful matter of the crop, instead of losing the whole, which appears to be the inevitable result if those tubers which are affected with the rot are left in the ground to ripen, or even stored up with others which are sound. The putrid matter which has been formed in certain parts of the plant, chiefly in the underground stem and roots, having been circulated through all parts of the plant, has induced decay or putrescence sometimes in the stem, sometimes in the leaves, and sometimes in the tubers. The putrid matter, or *ferment*, as it may be termed, contains nitrogen: it is, in fact, the gluten and albumen of the plant in a state of decomposition; and wherever it has caused decay, it has done so by causing the gluten and albumen of that part of the plant to enter into a similar state of decomposition. The next substance which begins to change is the cellular tissue, which, under the influence of the putrid azotised matter, putrifies also; and lastly, the granules of flour undergo the same change. It is almost impossible to arrest this effect in the tubers; for, when once commenced, it proceeds rapidly and with increased power, not only causing the whole of the tuber itself to decay, but also spreading to the surounding ones, the putrefying juice being fully able to develope putrescence in sound tubers.

The value of potatoes as food depends on the flour and azotised matter which they contain: in the diseased tubers, the latter is already destroyed; the former, however, remains sound, and therefore, by proper means, may be separated from the other substances, which are already destroyed, as constituents of food.

Water is essential to this species of decay, which would not proceed so rapidly if the potatoes of this year did not contain an unusually large proportion of water; hence the decay may be checked, or altogether arrested, by drying the tubers: this prevents the further spread of putrefaction, but it does not at all remedy the mischief already done.

The best plan, at present, appears to be that of separating the flour from the fibre, &c., of the diseased tubers. Those potatoes the haulm of which is already dead should be taken up at once, and partially dried by exposure to the air; this will check the progress of decay, and not interfere with the subsequent extraction of the flour. The following is a brief outline of the process requisite for this purpose:

"The tubers must be washed, and then grated or reduced to a pulp. Machines for this purpose may be obtained from agricultural machine makers, which will save a good deal of time when any quantity of potatoes is to be operated upon.

"The pulp, as it falls from the grater, should be collected in a canvass bag, as then the juice, which contains the greater part of the azotised matter, will drain away from the flour and fibrous portion of the tuber. The pulp must then be washed: this may be done on a sieve, or in a coarse canvas bag; the pulp being well stirred, whilst a small stream of water is suffered to run through it into a tub or other convenient vessel placed beneath.

"The water comes through milky, carrying with it the flour, and leaving in the sieve or bag the fibrous matter of the tubers, which may probably

be used with advantage in feeding pigs; but, as this is a matter perhaps open to doubt, it should be given with caution at first. The floury water, after standing about ten minutes, is to be poured off, when there will be found at the bottom of the vessel in which it stood a quantity of impure flour; this must be washed by stirring it up again with a quantity of fresh water, and then allowed to settle; the lower part of the flour will then be found to be pure and white, whilst the upper part is dark colored, and contains a good deal of decayed fibre; this should be separated from the clean flour, which is to be drained and placed to dry in a warm room, but not dried by artificial application to fire, which, if incautiously used, would be very likely to spoil it by converting it into gum. By this process, good flour may be obtained from potatoes which are brown and perfectly unfit for any other use; but as it is difficult to separate the decayed fibre from the flour in these tubers, it will be as well to separate as much as possible those which are quite rotten from those which are but slightly tainted, before grating.

"The quantity of flour in different kinds of potatoes varies considerably: on an average, a cwt. yields about 18 pounds of good starch; but some kinds yield considerably less. The quantity of flour in potatoes this year appears rather less than usual; but this is occasioned by their containing, for the most part, rather more than the usual proportion of water. The average proportion of water in good potatoes is about 80 pounds per cwt.

"The great advantages of proceeding thus with the diseased potatoes are, that, in the first place, the process is certain to succeed; and, in the second, that it costs nothing beyond a little labor of women and children, and such an apparatus as every cottager must have, except a bread rasp; and for that an old coarse file, or even a brickbat, or any thing else having a rough and hard substance, may be substituted; or the potatoes may be crushed by a heavy instrument. The arm of an old shirt, or the leg of a pair of worn out canvas trowsers, or a piece of an old flannel petticoat, will make strainers, fine or coarse, according to what is wanted, and no fuel is required to dry the material. All that the laborers have to attend to is not to allow the water and starch to stand for more than ten minutes at a time. It is true that all the azotised matter will thus be lost, but what is saved will have considerable value; and there is no sort of difficulty in the extraction of the flour, which, where cottagers are concerned, will be best effected by the first of the Hadleigh processes.

"There is an additional point on which a word of advice might be given. Professor Morren recommends that the haulm should be removed and burnt, whenever it is quite withered. The practice of cutting it off and raking it in heaps has been followed by many persons from the first appearance of the disease, and, as we have before stated, there may be some advantage in doing so. This, at least, is certain—that no advantage is gained by leaving decayed haulm on the field. We do not, however, attach much importance to the burning; it can do no harm, and that is all.

"Nor would we advise the haulm to be removed unless it is very bad; because, as long as it is green and healthy, it has a daily tendency to ripen the tubers, and thus to keep off the evil. If, however, the leaves are yellow, we should take up the crop."

The above was all in type, when we received the following very important communication from the Rev. Mr. Berkley:

"I have just received from Dr. Montagne specimens of a very curious

parasite, which occurs in the intercellular passages of potatoes during the process of germination, or just as it is completed. It was discovered in the course of some experiments by Dr. Rayer, chief physician of the Hospital de la Charite, at Paris, who has been paying great attention to the disease with which potatoes are now affected, and who purposes to publish an account of his observations, which I am assured are most interesting. Amongst other points, he finds that though the grains of fecula which are found in the cells of the diseased potatoes are not injured, they gradually diminish in number, as in the germinating sets, till in some cases all are completely absorbed. It will be important, then, to convert the diseased tubers into flour at as early a period as possible.

"Dr. Montagne considers the parasite above mentioned to belong to a new genus, allied to sepedonium and asterophora. He has given the little mould the name of artotrogus hydnosporus.

"Those who have had access to the late numbers of the Journal of the Institute, will find some interesting matter respecting the potato murrain."

The importance of this communication consists in its revealing the fact, that the flour itself disappears, though not undergoing decay. It is therefore of the first consequence that those who mean to operate upon their decaying crops should do so without a day's delay.—[*Editorial.*]

DISEASE IN POTATOES.

Notwithstanding the fineness of the weather, the potato blight is making rapid progress.

Patches which were perfectly green a week ago, are now blackened as if by frost. In every case I find the Botrytis infestans preceding the work of destruction. It appears while the leaves are yet green, or yellowish green, and the parts attached soon become brown and withered.

The appearances exhibited by some smooth ash-top potatoes in my garden convinces me that the spots upon the tubers arise from the attack of the mould, and that the mould is not an after organization. The spots form the most distinct concentric circles, disposed in one or sometimes two systems, exactly as in Oidium fructigenum, as figured by Ehrenberg, in his Mycetogenesis, and as it may be seen almost every autumn on fallen pears and apples. In re examining specimens in which there was no external appearance of mould, I found the spawn very evident in the diseased cells; but, as I before observed, the grains of starch sound and unaffected. Some of the cells contained little cubical colorless or brownish crystals, which I had not previously met with. If the infected tubers are shut up for a day in a tin box, the mould appears externally in little white patches, and soon fructifies.

The grains of starch being perfect, it was a matter of interest to ascertain whether the tubers would produce good potato flour. I accordingly chose six highly infected tubers, of a moderate size, some of which were strongly impregnated with spawn, and others partially decomposed, and I was pleased to find that they yielded about an ounce of flour, of which I send you a sample. You will perceive that it is *very slightly* discolored, but otherwise it is apparently of good quality; and I doubt not that, if

made on a large scale, very pure fecula might be obtained. My specimen, indeed, would have been of a purer white, but for a little accident.

M. J. B.

King's Cliff.

—

I remarked that whenever the crops were fully exposed to the influence of the sea breeze, especially on the sides of the hill sloping down to the shore, (facing north, northwest, and northeast,) they were altogether free from any appearance of the disease. An interesting question may arise from this, as to what the effect of a saline atmosphere may be in preventing the attacks of the fungus.

AMBULATOR.

—

Is it not probable that one of the causes of the disease arose from the poisonous matter belonging to the fungus mould being rapidly thrown back into the plant in the cold weather in the early part of June, following, as it did rapidly, the excessive heat of a few days previous? On the 12th, 13th, and 14th of June the thermometer, in the shade, marked 77°; in the sun, 95°; and on the 18th it was as low as 47°; the average temperature being 69° on the first three days, with bright sunshine, and no more than 57° on the 18th and 19th, with cloudy weather. All the potatoes examined present a similar appearance, and first begin to show symptoms of disease where the tuber is attached to the fibre; it thence gradually appears round the rim, through a vein, whence it rapidly spreads through the whole potato.

W. W. CHILDERS.

St. Hellier.

—

On my attention being first drawn to this disease, I took up a few potatoes which were just beginning to spot, and I must add, that in some places the blackness in the stem had just commenced; these looked, to all appearance, perfectly sound, but having been compelled to sort them over, (within a fortnight of their removal from the ground,) about 10 per cent. were found decayed, with the usual symptoms.

I have examined several of the neighboring fields, and the conclusion I have come to is, that, with regard to sorts, those of the grossest habit, and, with regard to land, that which is richest and oldest tilled, are the most unfortunate under the attacks of this pest.

On very poor soils, the disease would appear to merge itself finally into a sort of desiccation; the stems which on gross soils become pulpy, on weak and poor upland soils appear to wither and dry up.

R. ERRINGTON.

Oulton.

—

The appearance that the leaves of the potatoes in this neighborhood have lately assumed is so similar to that described in late numbers as the

first stage of the disease, that I am induced to send you specimens for inspection. I have not seen any instance, however, in which the tuber, or any considerable portion of the stalk, has decayed, though I have heard of some cases along the seacoast. Do you consider this to be the commencement of the same disease that prevails in the south of England? and, if so, can any thing be done to arrest it in its present stage? Would it be a good plan to cut off the stalks, or would it be preferable at once to dig the potatoes, though not yet ripe? My chief reason for hoping that it is not identical with the English disease is, that it could not have been caused in this county by cold and wet, having first appeared about a week ago, after a fortnight of dry and bright weather. As far as I can learn, it was first observed on the evening of the 8th instant, which was a very hot day, succeeding a slight hoar frost. [We fear the disease is our English murrain.]

WM. R. MEADS.

KINSALE.

From the Mark Lane Express.

I am convinced the cold and rainy weather experienced in July is the cause. Long before the haulm showed any observable sign of disease, the root was spotted. On examination, I found the stems damaged just below the surface of the soil, to that part attached to the old set. As the supply of sap was thus cut off, the tops soon afterwards began to show the effect: some died down very rapidly, others threw out fresh roots, that prolonged the existence of the stems, which still retain a greenish hue.

Some potatoes taken up in July for family use were so black that they were laid aside; the crown end was generally the worst. I have since frequently examined these potatoes, and from their present appearance I conceive that exposure to the atmosphere will stay the disease from sinking into the potatoes. These potatoes soon became pitted, the diseased parts fell in, and became dry and hard, and now peel off with the skin, showing a sound and uninjured remnant beneath. This circumstance, I think, proves excess of moisture, aided by the cold state of the atmosphere, which prevented the usual exhalations, to be the cause of the disease.

G. S. C. BURROWS.

STOKE HOLY CROSS, *Sept.* 9.

In every case I have found the same result. The potatoes exposed to the air in any part are tainted more or less by the rot on their surface. Those only one inch under ground are perfectly safe. The haulm of all is withered, except in certain spots under trees, and there it is still erect, and the end leaves still green, although it generally withers first in those spots in ordinary seasons.

I should here observe that my garden is on the north base of a hill 600 feet high; that it is so much shaded by trees as to have, in the height of summer, not much sun, and in the early spring the sun scarcely touches it, rising very little above the hill. Yet, at such seasons, when my neighbors on more open spots (even on the south side of the hill) complain of sharp night frosts, my garden scarcely, if at all, suffers; and my crops are generally as good and very nearly as forward as theirs.

From these premises, I come to the conclusion that the cause of the mischief to the potatoes is the cold, and nothing but the cold, which we had in July, after great heats.

The potato (a native of Chili) is always sensitive of cold—the slightest frost in spring cutting off all above ground; and I conclude that when the tuber is in a state of rapid growth during the heats of July, a sudden and great diminution of temperature, without amounting actually to frost, is enough to damage its surface.

We see the effect here, in the corruption of such tubers as have grown in contact with the outward air, as well as in the general withering of the haulm, while that which is protected by trees overhanging is preserved, and there seems to be hardly a reasonable doubt that the cold alone is the cause.

Of course, in districts exposed to the colds, as potato grounds usually are, the effect will be much more severe; and the failures of the crop in Belgium, (a flat, open country,) about which there has been so much learned speculation, seem to fall in with the theory.

I find that my neighbors who have suffered most plant as shallow as possible. I have my potatoes planted at six inches depth, whenever I can overlook the gardener, and oblige him to comply with my whim. Your constant reader,

E. V.

Bath, *Sept.* 11.

To the Editor of the Gloucestershire Chronicle:

The disease apparently attacks the plant in the fibrillæ of the roots, and where the root passes into the tuber or solid bulb of the potato. An interruption having taken place between the supply and demand of the living plant, by the decay of the root and its fibrillæ, its stalk quickly drops and withers, in proportion to the progress of the malady. The thin outer coat of the potato may now be perceived roughened and thickened in one or more patches; and these, when cut through, show that the internal structure of the tuber is altered—the change commencing immediately beneath the cuticle or outer skin; the pulp is changed to a rusty brown color, like a bruised apple, in thickness varying with the intensity and duration of the disease; eventually the structure of the whole potato is converted into a reddish-brown, half-rotten looking mass.

When slices of the altered structure were examined through a microscope, many of the cells containing the farina or starch were thickened, enlarged, and emptied apparently of their contents, the appearance differing in many respects from the natural formation of the healthy tuber. Here and there could be seen small transparent globules: some of them, apparently becoming more opaque, and a few surrounded with opaque reddish-colored fibres, might be considered to belong to some species of minute fungus—perhaps the torula, a species of which is found in the products of fermented liquors. This disease, whether produced by parasitic fungi, or by change of structure, induced by atmospheric vicissitudes, rapidly destroys the potato affected with it, rendering it at once innutritious and unwholesome—the farina of the pulp being converted into sugar and the diseased fungoid-looking substance.

Having, as far as opportunity and leisure permitted, attempted to describe

the disease, I will now suggest the remedy: Chloride of lime, or chlorinated lime, is a well known disinfecting and anti-putrescent agent; it will prevent insects and parasitic fungi attacking seeds and plants; this remedy is a safe one, and free from poisonous effects, not being injurious to vegetable growth when properly diluted and judiciously applied. Therefore, to this active agent would I advise all those who wish either to prevent the ravages of the disease, or to check it before thoroughly developed in the plant, to have immediate recourse. The mode of applying it may be as follows: Mix one ounce of the powder of chloride lime with a gallon of water, and well sprinkle the solution over the rows of the potato crops. I would also recommend the same solution to be sprinkled over the recently dug potatoes, but they must afterwards be dried before laying them up in store. A very small portion of the powdered chloride lime might be mixed with the saup or gravel laid over the floor of the potato bury or cellar.

I beg leave to remain your obedient servant,

THOS. HICKES, *M. R. C. S.*

GLOUCESTER, *Sept.* 11, 1845.

P. S.—Since writing the above, I have seen in this day's *Times* a letter from W. Herapath, esq., the celebrated professor of chemistry at Bristol, whose views in a great measure coincide with mine: he wisely advises the potato crop to be immediately gathered, the diseased tubers grated and prepared by washing in water, and the farina of the pulp, or potato starch, which is nearly as nutritious as arrow-root, may then be preserved for future use.

THE POTATO DISEASE, AND ITS ANTIDOTE.

To the Editor of the Mark Lane Express:

The manufacture of farina by the farmers has been recommended at present only as a "dernier resort;" but I would wish to show that it is a measure which should be adopted by all farmers who grow potatoes—not alone as a protection from the rot of the present year, but from the loss which always ensues from storing large quantities.

In addition to the general amount of loss by decay, another deterioration takes place, not generally known—namely, *loss by vegetation.* From the moment that that commences in the potato, the quantity of nutritive matter declines; so much so, that I have found the produce of a given quantity of potatoes, from the same crop, vary from 15 to 20 per cent. within a month in spring; in fact, the potato, which, if manufactured during winter, will yield one-fifth of pure farina, (possessing every property of the best arrow-root,) will not give more than a *tenth* if held over till May or June; and the loss is equal to the farmer, whether he consumes or sells, *for, in proportion as the vegetation proceeds, weight diminishes.*

It must be evident, therefore, that inasmuch as the true nutriment of the potato exists in the farinaceous particles, their preservation at the period they are most abundant should be the object of the farmer; the more particularly, as, thus preserved, farina becomes food for all classes of animals.

For man, its benefits are most varied. Used, in the proportion of a fifth or fourth, with wheaten flour, it produces a much better and more wholesome bread than from wheat alone. For pastry, in the same or greater pro-

portions, it is infinitely preferable; and in all cases where flour is used for culinary purposes, it is in every way better and more nutritious. When once properly dried, it possesses the invaluable property of absolute resistance to damp or mould; and it has been proved that sea biscuit, made in the proportions named, returned, after a voyage of three years in the tropics, perfectly free from weevil. In short, for household use it possesses the most singular advantages, (amongst others, being really a better *starch* than wheaten,) and is sold now in large quantities, under the designation of "*patent soluble starch.*"

For cattle (particularly for rearing calves) its value is also very great; and, mixed with any coarse stuffs, it gives the most abundant advantages. In addition, the pulp or fibre of the potato, which should also be saved and dried as well as the farina, is an admirable food for pigs; resembling more, in its effects, *barley* feeding than any thing else, and producing a very white meat, with a transparent fat.

But, before I conclude what, as I fear, is already too long a letter, I must add, that even the smallest potato in the crop will yield its quota of farina, while, if sold, it brings but a third, perhaps, in price; and thus another advantage accrues, by enabling all inferior sized potatoes to be manufactured, while only the best ones are kept for household use.

I am, sir, your most obedient servant,

JASPER W. ROGERS.

DUBLIN, *Sept.* 26.

From the Mark Lane Express, September 22.

THE POTATO CROP.

At a meeting of the Hadleigh Farmers' Club, on Friday, September 13, the lamentable failure of the potato crop formed the principal subject of discussion. In the hope of allaying the alarm which prevails in the neighborhood respecting the use of potatoes that have become partially injured, and also of suggesting a method by which a large amount of wholesome food may be saved from such as would otherwise be thrown away or given to pigs, it was resolved that a statement should be circulated, expressing the opinions of the club on these subjects.

I. It appears to be certain, that the failure is entirely owing to the season having been unsuited to fully perfecting the tubers of most of the varieties of the potato.

II. Wherever the leaves and stems are dead, it is advisable to dig up the crop as speedily as possible, and to select the best tubers (to be kept apart from the rest) for seed potatoes. It is probable there will be a great scarcity, when sets will be wanted, unless precautions are pretty generally adopted for saving the best.

III. The potatoes thus separated for sets should be preserved with more care than usual. They should be kept as dry as possible, and examined at intervals to see whether any of them are beginning to decay, and all such should be immediately removed.

IV. The spotted and decaying potatoes should be carefully picked out from among such as are to be preserved in store for winter and spring use.

V. As there is great danger from a single decaying potato being left in contact with others in the same heap, lest it should tend to rot all around it,

care must be taken to stack the store potatoes in layers, with sand or dry earth between them, and so that each potato may be prevented from touching its neighbors. A trench might be advantageously dug around the store; and if the whole were thatched, it would tend to keep them very dry. It will be advisable to delay the operation of clamping as long as possible, to allow the potatoes to dry the more thoroughly.

VI. The progress of decay in the spotted potatoes may be stopped (at least for some time) by exposing them in dry situations to the light, but their decay will proceed if they are placed in the dark, or on moist ground.

VII. If the decaying parts are pared off, or cut out, the rest of the potato is perfectly wholesome. Many idle rumours have prevailed to the contrary, which are unworthy of credit.

VIII. If the decaying potatoes have not passed to a state of putridity, they may be safely given to pigs; but they would be improved by being scalded, with the addition of a little salt.

IX. It seems to be a providential arrangement that, as yet, the really nutritive portion of the potato is very little injured, even in those tubers which have become partially decayed, and appear to be wholly unfit for food. The nutritious portion of the potato consists of delicate white grains of starch like matter, which are enclosed in little cells. When the cells are broken, the grains fall out, and, collecting together, form a beautifully white flour. It is very easy to separate this flour from the rest of the substance of the potato; and if a few persons in different villages would undertake to make the method generally known among the poor, a vast amount of wholesome food may yet be secured to them, which otherwise they will suffer to perish. From an experiment that has been tried during the past week, it appears that where 12 lbs. of flour can be extracted from a bushel of sound potatoes, 8 lbs. can be procured from such as have become so far decayed as to be useless as an article of food.

X. To obtain the flour separate from the decaying cells, the potato should be first very thoroughly washed, so that not a particle of dirt remains upon them. They should then be finely grated with a bread grater into a tub of water, and the pulp well stirred about to separate the particles of starch, as much as possible, from their cells. The whole should then be left to settle, and the heavier particles of starch will soon fall to the bottom, while the lighter skin and cells will continue floating in the water, and may be poured off with it. The mass of flour formed by the settling of the particles should be washed two or three times more, by pouring water upon it and stirring it about, and again leaving it to settle as before. After the flour is considered to be sufficiently washed, it must be spread upon a cloth placed on a board in the sun, or in a warm room, to dry, or it may be dried in the oven after the bread has been removed. It may then be kept for any length of time, and, when wanted, used like wheat flour for making puddings, &c. This process will be sufficient for common purposes; but a more perfect method may be described, by which the potato flour can be procured in its purest state, in which it is frequently sold for arrow-root, and by a variety of other names, as a delicate food for weak digestions, for children, and for the sick.

XI. The more perfect process for obtaining the flour in the form of "British arrow-root," is as follows:

1. Thoroughly wash the potatoes.
2. Peel away the skin, without cutting off much.

3. Grate the peeled potatoes finely into a pulp.

4. Place the pulp on a hair sieve, pour water over it, stirring it about well, till the water ceases to pass through with a milky appearance.

5. The pulp left on the sieve may be thrown away, and the milky water put aside to settle.

6. When the particles of starch have all settled, the water should be poured off, and fresh water added—the whole stirred up afresh and allowed to settle again.

7. These washings may be repeated four or five times, when the starch will have assumed the character of arrow-root, and will have become white as snow, while the water will now be perfectly clear.

8. The prepared flour must be thoroughly dried, and may be kept for any length of time in jars or casks.

XII. When a dish of potatoes is about to be obtained from the inside parts of such as are only partially decayed, instead of peeling them the decayed parts may be grated, and whatever starch can be extracted from these parts might be added to the boiled potatoes. Thus very little will be lost of the whole amount of nourishment which the potatoes would have contained if they had been quite sound. In many cases it may be more convenient to keep such gratings for three or four days, till enough has been collected to make it better worth while to complete the process.

XIII. In times of scarcity, it may be useful for persons to be made aware of the fact that excellent starch-like arrow-root may be procured from certain wild plants. In the Isle of Portland, some of the poor are in the habit of preparing it from the tubers of the plant commonly called "lords and ladies," (*arum maculatum.*) The tubers are well washed and grated, and the pulp treated like that of the potato. The process gets rid of an acrid juice with which the fresh tuber abounds. This sort of arrow-root is sold in the neighborhood of Weymouth for about 8*d.* the pound.

XIV. It was suggested that local companies or societies might be formed to buy up the decaying potatoes, and to employ some of the poor to prepare the starch, which could be sold at little or no loss. It is the practice in Scotland, when the store potatoes are found to be frozen, to extract the starch from them in the manner described.

From the Bristol Mercury, September 20.

THE POTATO DISEASE.

The following correspondence has just taken place between Lord Portman, President of the Royal Agricultural Society, and William Herapath, esquire, the eminent analytical chemist of this city, in reference to seed potatoes for 1846. His lordship, in a subsequent letter, requests that the correspondence may be made public, and it has been handed to us by Mr. Herapath for that purpose. The subject is of vital importance, and is worthy of the deepest attention.

"Bryanston, *September* 13, 1845.

"Sir: I observe in the newspapers that you have directed your attention to the potato disease, and have advised as to the use of the starch, &c. As I am specially bound, during this year of my holding the office of President of the Royal Agricultural Society of England, to promote inquiry and

to notify observations on subjects relative to the produce of the soil, I trouble you with this letter, and ask if any method has occurred to you by which the potato may be preserved for the planting of 1846? I have found that potatoes apparently sound and free from the disease, though in a field or garden which has been partially diseased, have, after being stored away, shown signs of the disease, and have rotted off; and I fear that the greatest quantity of the potatoes will thus perish, and so continue the distress of the poor into another season. I have directed some potatoes to be stored in slacked lime, in the hope that it may preserve them, but have, of course, yet had no time to judge of the effect. I therefore ask for your opinion, as one of our most eminent chemists, upon this point, and would ask leave to make known your reply, if you are able to offer an opinion sufficiently explicit to be useful.

"I remain your obedient servant,
"PORTMAN.

"Wm. Herapath, Esq."

"Bristol, *September* 17, 1845.

"My Lord: In reply to your letter of the 13th instant, I must say that I do not think it would be either safe or prudent to depend upon the infected potatoes of the present season as seed for the next year; as, in all instances, I have found the diseased parts to extend when the potatoes are kept in a damp situation. I should therefore expect that if any diseased seed was kept so dry as not to rot before setting time, yet, upon being planted and left in the damp soil, the rotting process would then begin, and the hopes of the husbandman be disappointed. I have no doubt that some potatoes, apparently sound, have (as stated by your lordship) been found to be affected after stowing away; but I do not consider this to have been an origination of it, but merely that which was unnoticed when dug has become apparent after storing. When a potato is first affected, the diseased parts are scarcely visible; but upon keeping it in a dry place, the spots soon become dark, and consequently more apparent, but the spots do not extend; if, however, the tuber has been kept in a damp place, the spots not only extend rapidly over the surface, but penetrate into the interior, and in a short time it will be completely rotten. As far as the slacked lime, which you have used in your potato stores, has a tendency to prevent the tubers from touching each other, or, by its power of absorbing water, of keeping them dry, it will answer a good end; but it must not be expected to have any chemical effect upon the diseased parts or their juices. Anything which, like dry sawdust or sand, would prevent contact, would prevent the propagation from one tuber to another; and any substance capable of absorbing the moisture of the air in which the potato is stored, would prevent the extension of the disease in each diseased root. Our best microscopists and cryptogamists are divided in opinion as to whether the cause of the calamity is a fungus or not. After all the examination I have given to the subject, and a careful review of all the evidence brought before me on the two sides, I believe that it is; and I am daily confirmed in the opinion originally expressed, that the only advantageous way of treating the diseased potatoes is to obtain from them, by rasping and washing, the starch which they contain, by which process all their nutriment can be retained; and if it is well dried, it will keep for any

length of time. The operations can be performed in the cottage or manufactory alike, as no apparatus beyond a tin rasp, (a nutmeg grater) a tub, and clean water, are required; and I have ascertained that however far the disease might have extended, even if the root is rotten, yet the starch can be separated, and in a state fit to be eaten, if it shall be well washed, as all the bad parts come away with the water, while the great weight of the starch carries it to the bottom of the vessel. If it is required that the fecula should have all the qualities of the best foreign arrow root, it is only necessary to wash it last in water containing a little chlorine, when it has unrivalled color and quality; and this I can speak of practically, having made many tons of the article.

"I will only add, that an opinion has been circulated that the disease is owing to the introduction of guano as a manure; this I feel no hesitation in contradicting, as I have seen it in situations where no guano has been used, and where every other variety of manure has been resorted to.

"I am your lordship's most obedient servant,

"WILLIAM HERAPATH.

"To Lord Portman, *President of the Agricultural Society.*"

From the Mark Lane Express, Sept. 29.

STORING AND PRESERVING POTATOES.

To the Editor of the Exeter Flying-Post:

Sir: As the hope of saving the important potato crop precludes waiting the result of our experiments, I have again to offer suggestions for others also to consider, correct, or improve.

The failure of the last, where the added moisture counteracted the benefit of the salts, has been a guide to my present experiments, which have not yet time to test their efficacy. It must, however, have fallen under the observation of others, that, of two parcels of the same potatoes, whilst one, heaped together, will putrefy, the other, spread out on a dry floor, will make no progress in decay, but rather lose their offensive smell. Hence, without staying at present to discuss the *cause* of the rot, drying appears to be one of the readiest means of checking it; and, accordingly, kiln and oven-drying have been recommended, both of which appear to me quite inadequate to the great quantity of the subject, with its large proportion of juice.

Before suggesting another method, let me ask whether others have also observed three varieties of the rot, either different degrees or belonging to different kinds of potato?

1. The tuber not much discolored inside or out, but having a pungent odor when cut, like putrid horse-radish, and decaying quickly; this chiefly in white potatoes.

2. Brown spots or patches more or less throughout the tuber, with little offensive smell, and much slower in progress than the first; this chiefly in red potatoes.

3. Coating, limited to the compact outside layer, the inner side of which is often marked by a distinct brown outline, the heart remaining sound and sweet; this only in reds.

This division is not taken as the basis of the classification below, being drawn from local and limited observation; but, if found coincident with the appearances in other places, may assist in the selection,

Dr. Lindley, (*Gardeners' Chronicle*, August 30,) whilst recommending kiln-drying to such as have opportunity, seems to feel its inadequacy generally, and suggests pitting in dry earth, so as to prevent contact and communication by perspiration. But can we not, by using *fire*-dried earth, which will absorb much moisture from the potato, effect the double purpose of drying and separation? With this view, the potatoes may be divided into three classes or conditions.

1. Apparently sound: to be pitted in fire-dried earth, entire.

2. Infected, but not hopelessly decaying: to be cut and pitted as the first; with or without salt.

3. Putrescent, unfit for use or keeping: to be ground into starch, without delay.

A brief explanation of each of these three methods may be sufficient for our present purpose.

1. Apparently sound. However impracticable it may be to find oven or kiln room for our potato crop, there is no great difficulty in fire-drying any requisite quantity of earth; which may be done in heaps, in the field, in some of the methods practised for clay or marl burning, only using small coke, "brise," or cinders; as the ashes of wood, or soot from coal, might excite vegetative action, and thus prevent the good keeping of the potatoes.

Air-dried earth contains much moisture, which may be driven off by a heat a little above boiling water, leaving the earth very greedy for damp, which it will suck from the air, or from any juicy substance in contact with it; but if made red hot, it loses much of this attraction for moisture, and should therefore be rather dried than burnt. The sooner it is pitted with the potatoes, after cooling, the better, that it may have the less time to draw moisture from the air. It should, however, be quite cold, because potatoes spread out in the sun are said to rot quickly. There should be earth enough to fill in between the potatoes, and keep them in separate layers; and it is almost superfluous to add that they should be pitted in very dry ground, and covered from the rain.

The poorer the earth in humus the less smell it will acquire in fire-drying; but sandy soil is very little absorbent.

2. Slightly infected. These may be cut in halves from stem to nose; when such as appear past hope may be turned over to the third class, for starch.

The less damaged may be pitted, with the dried earth, in separate pits from the sound ones; when the earth in contact with the cut sides will suck out the diseased sap.

It is a question whether the earth for these might not be mixed with some salt, (say one-sixth or one-eighth,) which would not only help to suck out the sap, but would more or less enter the substance of the potato, and probably contribute to its preservation. The salt might be tried in a pit or two only, at first; and extended in its use, afterward, if found to answer best, as the potatoes come to be taken out for sale or consumption.

These two methods can be regarded only as experimental, with a view to preserve the potatoes at the least loss and expense. The following is more costly and wasteful, but certain:

3. Those which are far gone, even half rotten and stinking, will still make good sweet potato starch, (see note) which will keep for years, and, with one-third flour, make excellent bread, puddings, or pastry.

For this purpose nothing more is required (as already stated in the pa-

pers) than a grater, a fine hair sieve, two or three pans, trays, or tubs, and plenty of clean water. The potatoes must be thoroughly washed, the very rotten parts cut out, and the clean part grated into the sieve. Here it must be continually stirred about, and watered with a watering pot, to wash the starch through the sieve, into a pan or tray, to settle.

While the starch is settling, the pulp remaining in the sieve may be pressed in a cider press or otherwise, and, if well squeezed, will keep a few weeks, sprinkled with salt and vinegar. It may be boiled for pig feeding; and as vinegar is the best preservative of vegetable substances, palliates the action of vegetable poisons, and has a particular tendency to fatten pigs, it is a very desirable addition. Where, however, vinegar is wanting, other acids may answer, as the muriatic or sulphuric, in very small quantities; perhaps even the apple pumice; or the potato pulp itself will often turn sour by standing open in cold water twenty-four to thirty-six hours.

When the starch is settled, the best and whitest will be at the bottom, covered with particles of peel and discolored fibre; and a little management is necessary in washing off the upper part, from vessel to vessel, and letting it settle repeatedly, to get as much of the clean white as possible from the colored. The last colored residue may be thrown back with the pulp. After several washings, the water may be poured away, and the white starch laid out on a cloth, upon some bricks or dry earth, to absorb the moisture, and then very gradually dried.

This is, however, a tiresome process, ill suited to the economy of a farm; the grating is slow, the repeated washings tedious, and the drying much in the way. It would be better done at the Union Workhouses, where the cleaned potatoes could be ground in a mill, figured and described in Parnell's Applied Chemistry, vol. ii, 133; and Ure's Dictionary of Arts, &c., p. 1166. This mill is not costly, and will grate two or three tons in twelve hours. There must be, of course, several sieves and watering pots, and a drying room is easily contrived in such an establishment.

Yours, &c.,
J. PRIDEAUX.

Note.—In the microscopic examination of a great number of potatoes, I have never found the starch damaged; it was either perfect and colorless, even when the cells and fibrous matter were quite brown, or if affected at all, it was completely dissolved, leaving the cells empty.

From the Brighton Gazette.

Various causes of the disease have been assigned, some ascribing it to the wet rot; but we cannot go away from our opinion, that it is in a great measure owing to the luxuriance of growth, induced by warm rains falling on the dry land after planting, and followed in June and July by hot, sunny weather, as it must be admitted that the ground has never been thoroughly saturated during the summer, although we have had much showery weather. The cause is ascribed by some to the tubers of last year having been allowed to get over ripe before they were dug up, and consequently unfit for planting. There is no doubt that over-ripe plants are more subject, in their growth, to the curl than the unripe ones; but if that were the cause of the general rot we have amongst them this year, both on the

Continent and in England, it is strange that the unaccountable disease has not shown itself generally before; for it is usual for farmers, in the south of England especially, to let their potatoes stand until the haulm dies before they take them up. The present summer is acknowledged not to have been so wet as the summer of 1843; and if so, why have we not seen the disease either in that year or in some former wet summer, when our potatoes have perished in places from the wet rot, but without showing the extraordinary symptoms and general decay of this year? It no doubt arises from natural causes connected with the weather, and we hope never again to see so serious a calamity, in the failure of this useful root.

From the Mark Lane Express.

POTATOES.

Sir John Maxwell Tilden has addressed the following communication to the editor of the *Gardeners' Chronicle:* "Having been particular in my examination of the plant, from the first appearance of the spot on the leaf, which attracted my attention in less than a week after its appearance, I feel confident that your explanation is quite correct, namely, that it is atmospherical and not terrestrial; or, in other words, it is caused by the want of due ventilation, evaporation being stopped by the damp and cloudy weather of July and August. Previously the plants grew with almost unexampled rapidity and luxuriance, so that the disease is more like apoplexy than any thing else. I found that when the disease first showed itself on the leaf, the tubers were sound to all appearance, but, when dug up for some time, some showed the plague-spot; but if the potatoes were forward enough to be dug up before the disease appeared on the leaf, they were still sound. The kinds I have examined are an early kidney, and an early round potato, having no particular name, and both having been grown on the spot for twelve years; and of the later sorts the Peach and the Red Rough are the only two I grow. These are but little affected, yet I find that every hill has one or more bad tubers. The diseased tubers of the early sorts are now shooting out in the ground where there is a sound eye in the root, and I have this day seen some with nearly half the tuber decayed, and from the other a shoot of two inches long, looking fresh and healthy. This has suggested to me the plan of endeavoring to save seed for next year by autumn planting; and I mean to proceed thus: Have all dug up as soon as I can, take out the sound ones, and leave those partially diseased on the ground to green, if they will, for about a week or ten days, and then to plant them as for a crop. Should they rot, nothing will be lost; for I consider they are more likely to rot above ground, and there will be time enough to plant again if seed can be procured; but I am convinced they will grow, as the very early sprouting of the diseased tuber (the healthy ones not having made the least shoot) shows that nature is taking her own course to preserve the plant. I shall not hesitate to plant in the same ground, but without fresh manure, as I do not wish to urge vegetation too fast, as I am quite convinced that the disease is only infectious by contact, and that it is not at all in the ground, but solely caused by the absence of sun, and excess of cold and damp."

From the Mark Lane Express.

After having read the many opinions given in your excellent journal, as to the malady and cure thereof, I have carefully watched the [potato] disease, and have come to the conclusion that the continued wet, *without sun*, is the whole and sole cause. I have also proved, beyond a doubt, that had we mown the haulm on its first visible appearance, we should have stopped the disease extending itself to the potato; that we should perhaps by that means have had our potatoes small and sound, instead of large and rotten. The above opinion I confirm, by having had worms in a field of wheat, and replaced the missing plants with potatoes, after which the plant of wheat so improved as almost to produce a crop among the potatoes; that in cutting the wheat about a month since, a quantity of the potato haulm was consequently cut or destroyed, and where that took place the plants have since been dry, and prove quite sound and good; since which I have had the whole of my potato haulm mown down, which should have been done a month sooner; but, " better late than never;" therefore I concur with your correspondent as to their being benefited by being harrowed.

A Kentish Farmer.

September 18, 1845.

To the Editor of the Times:

The real cause of the destructive changes at present taking place appears to be the unripeness of the tuber, and the consequent imperfection of elaboration of its juices. When examined with the microscope, the cells of the potato are found to be not more than half filled with starch-cells, many of which are incomplete, the remaining portion of the cell being occupied by water. Hence the actual condition of the potato may be stated as follows: 1st, deficiency of starch; 2d, imperfection in the tissue of the cell walls; and, 3d, excess of water; to which may possibly be added, imperfectly elaborated starch. As a consequence of the imperfection of the tissue of the cell walls, and its state of maceration in a superabundance of water, it falls speedily into decay, the change beginning at the surface and proceeding inwards, and being indicated by a brown discoloration of the cells. The starch cells, which are at first unaffected, are soon enclosed in the decayed cellular tissue, and, becoming involved in the decay, are thereby destroyed.

Taking this view of the state of the potato, two modes suggest themselves of preventing the loss which must necessarily result from the recurrence of the above described changes. The first is that recommended more than a week since in your journal by Mr. Herapath, viz: of separating the starch by reducing the potato to a state of pulp, and collecting the washed precipitate. When it is recollected that the starch embodies the whole of the nutritive part of the potato, the importance of this plan will at once be perceived. But, practically, there exists a great obstacle to the prosecution of the plan in the inconvenience of employing it on a small scale.

The second mode, that which I am now about to suggest, seems to me to be calculated to meet the exigencies of the case, at the same time that it is free from the objection stated above: it is, to dry the potatoes in an oven or kiln at a moderate temperature, and thus drive off the excess of water which they contain, the water being a chief agent in the decomposing process.

In preparing the potato for table the discolored parts should, of course,

be cut away; the potatoes should be boiled in two waters, and salt should be mingled with both.

I have the honor to be, sir, your obedient servant,

ERASMUS WILSON, F. R. S.

UPPER CHARLOTTE ST., *Fitzroy square, Sept.* 23.

To the Editor of the Dublin Evening Post:

I am indebted to a gentleman who resides in the neighborhood of Clontarf for the result of an experiment which he tried with perfect success. About three weeks ago, the disease having reached the neighborhood of Clontarf, my informant became alarmed for the safety of his potato gardens, and having seen in the *Evening Post* that the disease had its origin in the stalk, he resolved on removing the cause of communication to the potato, and without delay employed a great number of hands, and pulled up every stalk in the field. He is now digging out the potatoes, and never had finer in his life. The stalk cannot, at this late period of the season, yield further ripening sustenance to the potato; it might communicate the disease, and ought, on the latter account alone, to be removed. Not by the scythe, for the fibres would, as before, continue attached to the potato, and as much of the stem as would remain above the surface might be as pernicious as the entire stalk. The stalks ought to be, by the hand, one by one, carefully pulled up and removed from the field, lest, by heating in heaps in the first process of decomposition, the heat and effluvia might communicate with the potato near the surface, and perhaps diffuse the disease complained of, or some other equally destructive. The persons employed in the operation should be directed to place a foot each side of the stalk, by the compression of which it will come up freely, without disturbing the potato in the soil, in which it lies imbedded. W.

From the Mark Lane Express.

PEEBLESSHIRE.—From the general nature of the disease, there can be no doubt whatever but that it is produced from some general cause; and that, without hesitation, we attribute to the *cold, wet, ungenial season.* We find, in a field where a large proportion of the potatoes were earthed up with more than ordinary care, being some inches deeper in the furrow than the tubers were planted, which had the effect of preventing any excessive moisture remaining in the drills, that when the potatoes were lifted, so far as the unassisted eye could discover, they were perfectly free of any taint whatever, while in the other portion of the field, which had been less attended to, a large proportion of them was found diseased. We also find, by taking a potato of the *soundest* description, and allowing it to remain for two or three days amongst earth over-saturated with water, that the same disease is produced as that which is now so prevalent over all Scotland. A single drill in the field alluded to was planted with potatoes raised from the apple three or four years ago, by a knight of the shuttle, on the banks of the Ettrick, which were found, upon examination at lifting time, to be much more diseased than any of the other kinds we had planted. And others, too, we find from inquiry, who had tried the new varieties, have

met with a similar disappointment. In fact, until such time as we began to raise new varieties from the seed apples, such a thing as failure or disease was never once heard of; and to the result of this experiment we in no small degree attribute the deterioration of the *late* potatoes.

Fife.—The disease is still increasing; and great quantities, which seemed quite free from disease when lifted, have become quite *mouldy* and *rotten.* We regret we have been *so soon* able to report that several modes, adopted with a view of stopping the malady, have proved *fruitless.* Some were pitted very thinly, and ventilated with drain-tiles. The potatoes being quite dry when put in, have been found on the *decline.* Others, that were sprinkled over with lime, have been found even *worse* than some that have been kept in a dry, airy place, without being limed; while those left in the ground, and covered with an additional quantity of earth, intended to keep them all winter in the soil, are found with the *rot* still alarmingly increasing. The only remedy to prevent the disease from further increase in the tubers already affected, is, we are convinced, to keep them dry. For this purpose, we have seen some laid for some time above and over, and then stored by in a *dry, airy place.* When so treated, the disease, if increasing, goes on then very slowly. Many different opinions are prevailing as to the nature and cause of this disease; but it seems to some very glaringly to be the same dreadful epidemic that lately raged in spring—the same visitor, only come at another season. In consequence of the frequency of the disease in spring, the potatoes have become so weakened, that now, as soon as ripe, the disease appears; as it has been observed that in late situations it is longer in making its appearance than in early soils and situations. The vital juice of the potato seems lost; and this useful esculent will, it is the opinion of many, soon be unknown in our isle. A similar disease has, by some farmers here, been discovered among the turnips.

Roxburghshire.—That sort denominated the "old black potato," is universally the most affected, and seems to be threatened with extermination. They, however, are not now generally grown. Next in point of being affected are the "blues" and "buffs." An endless variety of other sorts is grown in the county, the names of which often vary in different parts; and these are all less affected than the three sorts above named. The soils in which I have observed the disease to prevail to a greater extent, are a light, turfy soil, upon a moorland bottom, and a thin, adhesive clay, upon an impervious stratum of till. This disease, like everything else, will have its proper cause, if it can be ascertained; and I am convinced that it has arisen from circumstances that can only again occur in such a season as the past. During almost the whole time that the young potato was swelling into size and advancing into ripeness, the quantity of wet in the ground, and the absence of sunshine, were peculiar; and these operating upon the potato-plant, in the tender stage of its growth, I am convinced, are the causes of the disease by which it has been affected. I am led to this conviction from the following circumstances: 1st. In narrowly watching the taking up of potatoes grown in a dry, deep loam, upon a sandy sub-soil, I observed that those which were placed in a horizontal circle round the stem, and near the surface, or partially bare, were not affected at all. 2d. Where the plants had occasionally penetrated deeper into the soil, and had produced one or more potatoes at the depth of eight or ten inches from the sur-

face, these, at that depth, were invariably affected, whilst those placed nearer to the surface, and attached to the same stem, were free of disease. 3d. In thin, turfy soils, or thin, adhesive clay, upon an impervious stratum, the potatoes were necessarily placed in a position where the wet was lodged between the soil and sub-soil; and these I invariably found to be affected. 4th. In these soils, potatoes lying close by the surface, or uncovered, were generally sound.

From the London Freeman's Journal.

FAILURE OF THE POTATO CROP.

Once more we repeat our thrice confirmed conviction, that to alternate frost and rain must be attributed the failure of the potato crop; and, of the soundness of our conclusion, we obtain abundant proof from the columns of some of our contemporaries who differ in opinion with us. Thus we find Mr. W. R. Meads, of Kinsale, stating in the "Gardeners' Chronicle" of Saturday last, that "the disease was first observed there on the evening of the 8th instant, which was a very hot day, succeeding a slight hoar frost." In the "United Gardeners' and Land Stewards' Journal," too, Mr. J. Barnes, of Bicton Gardens, Sidmouth, Devon, says: "I never felt the cold more severely in the month of March than I have done this season, during the last two weeks in July and two first weeks in August, usually most severe from half-past three to half-past four, a. m.; and I certainly never previously observed the morning frosts so severe at that season of the year." We could cite a mass of evidence to the same effect, but that would now be of little use; let us rather turn our thoughts to suggesting remedies for the evil.

In the "Dusseldorf Gazette" it is stated, that "a farmer, living on one of the estates of the Duke d'Aremberg, near Dusseldorf, has discovered a mode of preventing the rotting of potatoes, and even of curing it when it has already commenced. The method is very simple; it consists in merely harrowing deeply the earth in which the tubers are planted so as to produce an evaporation, which will diminish the fermentation caused by humidity;" and, it is added that the plan has proved completely successful. Let it be tried wherever it is not too late.

In our publication of Monday we quoted from the "Moniteur" a proposition for preserving from decay potatoes partially tainted, by a sort of semi-baking in an oven heated to 64 or 65 degrees of Reaumer, (about 180 of Fahrenheit,) and the plan, like that of converting them into fecula, or arrow-root, may answer very well on a small scale. We would recommend slicing, stringing, and hanging them in kitchens and outhouses, as apples are managed in America, as a means of saving a part of the crop, in addition to the two first described methods.

From the Gardeners' Chronicle, September 27.

POTATO MURRAIN.

It appears to me of some importance that naturalists should be careful to distinguish effect from cause. That minute and rapidly propa-

gating fungi have been observed on the affected potato plants, there is no reason to doubt. But when we know, from other facts, that such appear on plants after they are dead or diseased, and not when they are alive and healthy, we are justified in affirming that we are yet ignorant of the cause of the malady in question. To prevent its recurrence is what is desired; and it is worth while to try everything that may suggest itself from the consideration of any theory of the disease. It has not been ascertained whether it commences in the roots or in the leaves; and to determine this may be a difficult matter. If in the latter, it is to be feared that prevention is impossible. But it may commence in the tubers; therefore, without pretending to know the nature of the disease, or its cause, I will assume it to commence in the tubers, and offer advice accordingly. It is a well known fact that some insects reappear, after long intervals of time, in various members of the vegetable kingdom. It is not too much to affirm that some of these insects may be too minute for observation, and that this has given rise to many very improbable explanations of disease. That the most minute, as well as the largest insects, pass through several stages of existence, may be safely assumed; and also that one or more, or all of these, are passed in the earth. It is also known that insects deposite their eggs either on or near to that which is the food of the worm; and, in some cases, the worm may take up a position for its change into chrysalis, so that the fly may not have to go far for its first meal. These facts induce me to advise that it should be a constant yearly practice to wash all potatoes to be used for sets, when they are taken up, and to clear the eyes by means of a brush. This operation being done when the tubers are taken up, the eyes not having pushed, are not injured by the brush, which they would be were the operation deferred. This will clear the tubers of all eggs and chrysalids, and may be of service, while it can do no harm. G. S. MACKENZIE.

Rose Bank, Roslin, N. B.

Everything tends to confirm the opinion I previously expressed, that a certain degree of ripeness or maturity is necessary to feed the disease. Early sorts, from all reports, fall the first victims. Those upon dry, rich, well-drained soils follow; and late sorts, on cold wet soils, on hill-tops, or with north aspects, that tend to retard growth, seem for a time safe, and flatter the possessor they have escaped; but such no sooner reach the apparently required condition, than they may literally be said to wither in an hour. As a case in point: "Ambulator," in the last number, mentions being delighted with a field in full bloom. According to my view of the matter, potatoes in bloom are safe from attack. In my last communication I mentioned some of my own that passed that stage safely, within a few feet of earlier sorts reduced to a mass of putrefaction. "Ambulator's" will, no doubt, also decay; when I hope he will report progress. Salt, in culture, is no preventive. Has not the seacoast been worse affected generally?

The allotment field I mentioned as the first seat of disease was in many parts manured with fish and sea-weed, and washed by the spray. This, and the fact that the scourge first appeared on the coast to an alarming extent last year, sets the supposed influence of salt at rest. The parts affected last season were the first, by a month, to exhibit its fatal symptoms this year; a circumstance worth the attention of investigators.

JAMES MICKLE.

From the Gardeners' Chronicle and Agricultural Gazette, Oct. 4, 1845.

We do not as yet propose to return to an inquiry into the cause of the potato murrain, but shall continue to confine ourselves to a consideration of what can best be done under existing circumstances.

It is stated in a daily paper that M. Bouchardat, a French gentleman, has discovered a simple and economical process by which potatoes already attacked may be rendered fit for every domestic purpose. They are to be cut into thin slices, to be placed for thirty hours in water slightly acidulated with muriatic acid, then to be washed in pure water, and soaked 12 hours; after which they are to be dried in the sun, when they will again become white, with a healthy savor, and will keep any length of time.

We have tried this operation, and doubt its value. It is not said how much muriatic acid is to be employed; but, if making water just acid is all that is intended, then we have followed the directions exactly. The result is, that the slices become very white by the time they are taken out of the steep; but soon after they have been washed and exposed to the air to be dried, they change color, become livid, and have so uninviting an appearance that no English peasant would eat them unless pressed by actual famine. In a few days, however, the livid appearance goes off, and some of the slices become of a glittering white. This appearance is caused by the sides of the empty bleached cells in which the starch is laid, and not by the starch itself. Beneath is found a thin brown crust, and below the crust the potato seems to be exactly what it was before being plunged into the steep, or to be as livid as the surface was after the exposure to air took place. While, however, some of the slices dry in this manner, others refuse to do so, although laid on a dry board in a room heated by an Arnott's stove; and then, in fact, although placed next a window, speedily putrefy, and are attacked by mouldiness. We have, therefore, nothing to allege in favor of M. Bouchardat's process.

It appears from Galignani's Messenger, that, at the sitting of the French Institute of September 22, an immense number of communications on the disease of the potato are announced.

Amongst them, one in the name of M. Clerget, the inventor of a new process for making potato flour, was particularly mentioned. This flour is stated to be equal to nearly one-third of the entire mass—namely, 20 per cent. of the starch principle, and 10 per cent. of the bran or fibre. "His process is a scientific application of the old woman's process of mixing potatoes in the making of bread. This is well known. The potatoes are first boiled, then dried before the fire, and rubbed up with the wheat flour. M. Clerget produces the same result in the form of flour, emitting all the extraneous and useless portions of the vegetable, and providing for commerce, on a large and improved scale, a means of subsistence as cheap as it is wholesome." We do not profess to understand this account, but give it as we find it. Hereafter we shall learn from the Comptes Rendus what it really means * * * * * * * *

It is of far more importance to conduct the operation carefully. Professor Henslow obtained nearly six pounds of flour from a bushel of very bad potatoes; others, however, complain of not getting more than half the quantity. This, probably, depends entirely upon the care that is given to the rasping or crushing process. It is to be borne in mind that a potato is a mass of bladders, held together by organic force, and tolerably

tough. It is in the inside of these bladders that the starch is deposited by nature. If we could separate such bladders from one another, and could place them in a row, we should find that from 150 to 200 would come within the compass of an inch. Now it is necessary to burst or cut into all these bladders, if all the flour which the potato contains is to be extracted.

But no machinery yet thought of is capable of doing that. If, indeed, the potatoes could be placed between mill stones, yet the latter could not be set fine enough to crush every one of these extremely small bladders. There must, therefore, be some loss of flour in the operation of crushing, prepare it as we may; and of course the loss is great in proportion to the carelessness with which the grating or mashing is performed. One man will throw away a third of his flour in the midst of the pulp separated by the strainer; another, half; some more, some less; and it is to be remembered that no amount of washing will of itself separate the flour: crushing, mashing, pounding, &c., must be trusted to. It is therefore worth the consideration of the public whether the pulp should not be subjected, after the first washing, to some other operation, such as rubbing between two stones, or grinding, whereby the bladders which escaped the first process may be broken in the second.

But our space is more than exhausted, and we must for the present break off, with a renewal of our exhortation to potato growers to attend to *dryness*, above all things: *dry days* for taking up; *dry places* for storing them; *dry soil* for pitting; and every other precaution by which the *dryness* of the crop can be best secured against the dangerous months of winter.

* * * * * * * *

Amongst the many statements which have been made respecting the origin of the *potato blight*, there is perhaps not one which has been more widely spread than that which attributes its development to the use of highly azotised manure. A few words on this subject will not be unacceptable to those of our readers who are in the habit of using guano and similar strong manures. The effect which azotised manures exert on growing plants is tolerably well understood; it increases the growth of the plant, facilitating the formation of organized matter, and, provided the other constituents of vegetable food are also present, it causes a strong, vigorous, and healthy growth. Now, the substances required by plants are nearly all contained in guano; and, therefore, if light and heat are not wanting—in fact, if the weather is favorable to vegetation—there is every reason to expect that plants thus manured will become strong and healthy; there is no theoretical reason which should lead us to fear unhealthy or irregular growth.

There is no doubt that large and quickly grown plants are more liable to be attacked by any disease than such as are smaller; but the rapid growth of the former never *causes* disease—it only renders them more liable to suffer when other causes have combined to produce disease; at the same time, this tendency is much diminished by the superior vital energy of the larger and more vigorous plants. It is, therefore, not to be expected that plants supplied with azotised manures should be more liable to the influence of such rot as that at present common amongst potatoes, than those manured with farm-yard dung, or not manured at all; and this indeed is the truth, for so far from those plants only being attacked which were strongly manured, it appears that those which received no kind of manure at all are quite as much subject to the disease as those more highly manured with guano.

E.

In both kinds, the sound potatoes were always at the most remote point from the haulm, the bad ones being invariably just at the bottom of it; and the ends of the tubers, which seemed to be the first affected, in very many instances were also those ends attached to the haulm, while the crowns remained sound and good. This seems to me to be pretty conclusive evidence that the disease has been first generated in the haulm, and not in the tuber, and has been invariably transmitted downwards by the elaborated sap. Many of the reds were quite rotten, the inside having become a brown pulpy semi-fluid mass. But in the bread-fruits, this was seldom the case, the disease being confined either to the haulm end or to a circle running all round the outer edge of the whole potato, or merely to a few isolated patches, so that in most tubers there will be a sound heart, which will afford food for pigs, if good for nothing else. Our geological stratum is chalk, which insures of itself good drainage. Field potatoes are said to be better than garden ones here generally.

LEATHERHEAD. W. H.

I first dug the ash-leaved and Shaws about the 20th of June—the former in black mould and the latter in stiff loam—at which time there was no appearance of disease; but at the end of July, from the same places I found the potatoes diseased.

The cause, therefore, whatever it may be, did not apparently exist till the middle of July; and that moisture is either the cause, or medium, is, I think, certain, for this has been, from early in June, a decidedly wet season. The red and pink-eyed potatoes are the least affected, which I attribute to their possessing a large portion of farina, which does not decompose readily, preserving its character even in frosted tubers. In these I have not more than one-fiftieth bad, but in the early kinds one-half are affected. The latter average from five to eight lbs. of farina to the half cwt., but the former sorts yield fourteen or sixteen lbs.; showing, as regards nutriment, their great superiority. In early sorts the farina is not fully developed, being fibrous and watery, and the tubers are not so wholesome as when two-thirds grown.

The affected potato cannot be cured; and I believe the soil is not capable, from having once grown them, of producing the disease next season; and that the chlorides and other purifiers are so far useless. There is a great difference of opinion as to the cause of this calamity. I attribute it wholly to electrical agency. During the summer the atmosphere has been very much charged with electric fluid, and the moist state of the skin of the haulm acting as a powerful conductor, conveyed the fluid to the roots, and in its passage over the surface, and from thence to the next best conductor—probably another potato—it has produced the appearances which we perceive. The skin and tissue at the surface of the potato (but not the farina) loses vitality from the conducting power of the watery state, and is decomposed by the electric fluid; and which effect is probably increased when a ready conductor is not at hand. Upon this principle, potatoes grown on stiff soil, on clay bottom, will turn out the worst; and on gravelly or other porous soils, freer from disease.

Where first attacked, vitality is nearly destroyed by the sap being changed in character, and obstructed in its passage through the vessels; the leaves

and haulm become, as is usual in autumn, yellow, but from a different cause, and fungus may or may not generate itself in consequence of this premature decay.

Some of Professor Morren's observations I think are wrong. He ascribes the disease to dampness and cold air. A damp summer of itself is congenial to the growth of the potato; and when well moulded up, cold air cannot affect it. Besides, I find potatoes lying on the surface (and consequently green) not attacked at all, the air, as it were, "case-hardening" them; and these potatoes are not attacked with insects, but the wire-worms, &c., if there are any, very much infest the diseased tubers.

I should say the potatoes cease to grow, when first attacked, from the absorbents, which take up and afford them nutrition, being destroyed. I am told by a friend at Wantage, in Berks, that several old farmers spoke of seeing "white rain" fall during August, and expected unfavorable effects from it. What this white rain may have been I cannot tell, but blight has been very prevalent; and, as I before observed, an undue electric state of the atmosphere has also been prevalent. About 16 years ago I published, in the "Mechanics' Magazine," the method, as practised by me, of obtaining potato flour—its valuable uses, particularly in fattening pigs; and the valuable application of the residue of the root, when boiled, for previously feeding the store pigs with. Pigs fed only upon potatoes thus managed will fatten fast, and make fine pork.

ENFIELD. G. L SMART.

—

POTATOES IN IRELAND.

The ravages of the potato murrain have not appeared here yet; but there has been a disease in this locality for the last three or four years, which has done much mischief. Instead of commencing above ground, it seems to commence with the decay of the old set.

The tubers, as soon as they are formed, are attacked with dark colored ulcerated blotches, which soon spread over the whole tuber, and end in putrefaction; meanwhile the plant becomes languid, the leaves have a sickly yellow color, yet the plant still exists and forms more tubers, which are also attacked and carried off; the plant becoming more and more unhealthy, most frequently dies a month or six weeks before the healthy plants arrive at maturity. Nor does the evil rest here. Such tubers as escape the ravages of the disease in summer are attacked, after they are dug, during the whole winter, so that before the planting season again arrives the stock is in many cases completely destroyed.

The disease is quite local. It is not beyond six or eight miles from here in any direction.

Various remedies have been tried, such as having sets from a great distance; planting in drills instead of beds, (which is the common mode of planting here;) planting in ground which has not been broken up for a long time; planting very thinly, &c.; but almost all the trials have been attended with failure. One method, however, so far as it has been tried, seems to remedy the evil; that is, greening or sunning the sets. For the last two years those planted in the garden have undergone that process, and there has been no failure. Previously they were as much diseased in

the garden as in the field. The experiment has been tried this season in the field; and, from a partial examination, seems to have answered equally well. But the crop will be dug in a day or two, when you shall know the result. Enclosed are some diseased stems, with the late growth of tubers attached.

T. P. ELLIOT.

FLORENCE COURT.

[We are sorry to add that this disease is our English murrain, in a mild form.]

POTATOES AND SALT.

In a late number you inquire whether any one has used salt in planting potatoes. I have done this; but it may not be uninteresting to know that I dressed three half acres of newly and well drained peaty meadow first before breaking up for potatoes, and which were equally well worked and manured afterwards, as will be seen by the following statement:

No.	Lime.	Salt.	When planted.	Kind of potato.
1	5 one-horse cart loads.	3 Winchester bushels.	April 24 & 25.	1st, early; 2d, early; 3d, Highland, early.
2	Do	-	April 25 -	1st, strawberry, late; 2d, orange, early.
3	-	Do	May 1 -	1st, purple kidney, late; 2d, Highland, early.

The lime and salt were ploughed in immediately (January 11th) after the salt was sown. No. 1, all tops, except first early—gone long ago, but apparently from frost. Tops of 1st early all killed night of September 22. I find no tubers affected yet, but a mouldiness is to be seen on the haulm of many. No. 2, ditto; No. 3, far more of the mould, and a worse appearance. The potatoes in my garden (very dry sand) much as No. 1.

A CONSTANT READER.

From the observations I have made in this neighborhood, I am inclined to think that the saline properties of the sea-air do not prevent the disease, as some fields in the immediate vicinity of the sea have partially, and some have completely, failed; others are at the present time looking quite healthy in the haulm, and the tubers but little, if at all, affected. Now, does it not appear probable, that if the sea-air had any influence on the prevailing malady, it would have been more general in its effects; at any rate on those similarly situated? The sea-girt island of Jersey gives a strong proof of the non-effect of the saline air on this malady. And again, with regard to the effect salt has had, when applied to the potato at the time of planting: a patch of ground in my garden was planted in the early part of May, in the

following manner: The rows were opened with the spade about 4 inches deep; the sets were then placed in the bottom of the trench; the first lot was covered with refuse manure, the second with lime in a half slacked state, the third had a moderate quantity of salt sprinkled over the sets, and the fourth was covered with long fresh cut grass. They all came up about the same time, and were very strong in the haulm till within the last fortnight, when the tops began to die away very rapidly, and they were all cut off about a week since. The tubers have just been lifted, and I find the result, with regard to the murrain, to be as follows: Those manured with refuse dung were affected, as near as I can judge, to about 5 per cent.; those with lime, 10 per cent.; those with salt, about the same as the first; and those covered with fresh cut grass, I do not think the loss amounts to one per cent.

The potatoes, a pale red kidney; they go here by the name of *farmers.* The soil light, resting on a mixed sub-soil, consisting of gravel and clay.

G. S. H.

Glamorganshire.

—

I have about one acre of garden ground about half planted with potatoes, and it is situated within the reach of the spray of the sea, and abundantly manured with sea-weed. The result is as follows: First, my ash kidneys, planted in November in very light soil, are very little affected; Cornish kidneys, planted in December in light soil, are more than half affected; pink frame, in clay soil, about one-third affected; early Shaw, in clay soil, a total failure; Chapman's kidney, planted in June and July, (some in clay soil and some in very light soil,) two parts out of three affected. All the above were planted after the spade, and covered with sea-weed. I have about two rods of Chapman's kidney, planted as late as the 6th August, which have been looking remarkably green and well until within the last fortnight, but they are now completely cut off with the disease; so seaweed has not given me any protection whatever.

JAMES WOOD.

Harwich, Essex.

—

This parish extends along the shores of Mount's bay, and consequently a constant deposite of saline particles is going on, more especially when we have heavy gales from the south. Sea-weed is also very extensively used as a manure for potatoes, and also the beach sand.

The result of extensive inquiries has shown that no parish in our neighborhood has suffered to an equal extent with ourselves. We must, therefore, admit the conclusion that the application of salt, at least by nature, has not proved any preventive of the terrible scourge.

W. W. WINGFIELD.

Penzance.

—

I have made a circuit of several miles around this place, (Teignmouth,) and have found only one instance, with the exception of my own

crop, where the potatoes are not affected with the murrain inland, as well as on the very top of the sea cliffs. In a field where I found they were not diseased, I inquired what manure had been used, and the reply was, fresh sea-weed.

My own crop is planted on a high exposed hill, in a light gravelly soil, on a sub-soil of sharp gravel. The manure I used was one load stable dung, two loads of ashes of burnt weeds, two cwt. guano, and two cwt. salt per acre, mixed together, and sown in the furrows 30 inches apart, before planting the sets, the greater number of which were whole potatoes. I was informed that I should have very poor, watery, close potatoes, because always when salt or guano was used they were sure to be so, and, as I had used both, they would be very bad; but, instead of being so, I never had better potatoes—when dressed, they are like balls of flour.

COURTENAY M. KINGDON.

From the Gardeners' Chronicle, Oct. 11, 1845.

POTATO BLIGHT.

You have given us ample proof of the specific nature of the potato blight, and of its origin in obvious atmospheric causes, and every one must be struck with its analogy to the epidemic diseases of cattle, and the influenza like maladies of human beings. This analogy holds good in various aspects: its uniform character; its universality; its sudden invasion in various points at the same time; and its greater or less intensity, as modified by local circumstances.

It seldom happens that any notable epidemic, in animal or vegetable organisms, is so clearly traceable to its causes as the potato murrain. We see, nevertheless, that there is a diversity of opinion as to the share in the operation to be assigned to the several agencies. It cannot be wet alone, for much wetter summers have occurred within these few years without harm to the potato crop. It cannot be cold only, because the average temperature has certainly not fallen below the rate of districts and counties where the vegetable is always successfully cultivated; nor has there been, as your correspondents observe, any remarkable development of sensible electricity. But of all the incentives to a healthy vegetation, what has been so much wanting, for the last two months of July and August, as light? not merely bright sunshine, for of that there was hardly any; but even the ordinary quantity of daylight was wanting—so dense and black was the overcast, day after day, through this long period, a time when the vegetable world is in expectation, and generally in the enjoyment, of its fullest share both of light and heat. You justly suppose that the transient warmth of June gave a predisposition to disease by imparting greater sensitiveness or excitability to the plant. Doubtless another ingredient in the mischief was the absence of the usual ground-warmth that cherishes the vegetation of a more favored season. There is every reason to believe that the calorific rays penetrate the clouds and impinge on the soil, where the general diffusion of sunlight is not correspondingly powerful. Every practical gardener will observe that, at the end of even a very dull day in the middle of summer, the temperature of the soil on the surface far exceeds the warmth of the air, and even surprises him by its excess over the temperature of the same

soil in the morning. It will be said that in a dull day there is less radiation from the surface than in a clear one, and thence the accumulated warmth. It may be doubted if the difference in the ratio of light and warmth, as transmitted through a cloudy atmosphere, can be so accounted for, and the subject requires further investigation.

Were it not for this aptitude to receive the warmth of the sun, in the absence of the strong light of that luminary, it must be supposed that the soil must have been far below the average warmth during the past summer; so far as to be productive of still more extensive mischief than has yet accrued from it. But this article has already extended beyond its proper limits. The intention of the writer was to point out the propriety of greater accuracy in the application of the generic term "blight" than is usually practised, and not to swell the already voluminous discussion about the potato murrain; and, although the extraordinary absence of sunlight has been spoken of, it is not to be supposed that this has been the sole deficiency. There is abundant evidence of accumulated causes both of the primatic and repletive kinds; and potatoes die as animals do, by cold and starvation; some by decline and slow decay; others by mortification and sudden death.

* *

POTATO JELLY.

Independently of any consideration of what may be the uses to which the extraction of starch from bad potatoes may be put by the poor, under present circumstances, it seems to me not unlikely that your agitation of this question may lead to the general adoption of this substance in all families as a useful and important article of our domestic economy. The readiness with which a good sized basin full of thick jelly may be procured from a single moderate sized potato, is a fact worth knowing. I have several times repeated the experiment, and find that it does not require more than eight minutes to change a raw potato into a basin full of most excellent jelly, which has only to be seasoned with a little sugar, nutmeg, and white wine, to please the most fastidious palate. To obtain this jelly in perfection, let a potato be washed, peeled, and grated; throw the pulp, thus produced, into a jug of water, and stir it well. Pass the mixture of pulp and water over a sieve, and collect the water which passes through into a basin. Let this stand for a few minutes, and a sufficient quantity of starch will have fallen for the purpose required. Pour off the water, and then keep stirring up the starch at the bottom of the basin, while boiling water is being poured upon it; and it will soon and suddenly pass to the state of jelly. The only nicety required is to be careful that the water is absolutely boiling, otherwise the change will not take place. Mr. Darwin has recorded an instance of some of his attendants being unable to boil potatoes above a certain height on the Cordilleras, owing to the diminution of pressure not allowing the water to become sufficiently heated before it boiled. There may possibly be some connexion between the conditions under which potatoes can be boiled and their starch converted into jelly. Upon comparing this jelly with that from the starch called arrow-root, and obtained direct from Bermuda, I find a difficulty in my own person in discriminating between their flavor; though an invalid, in the habit of eating arrow-root, at once detected which was which. The difference,

however, becomes more sensible when both jellies are made palatable with sugar, &c.; for then both the invalid, myself, and another person were equally decided in our preference of the jelly from the potato to that from the arrow-root—the latter possessing a rather mawkish flavor, as though it had been prepared with smoky water.

J. S. HENSLOW.

HITCHAM.

From the Gardeners' Chronicle of October 18, 1845.

POTATO MURRAIN.

I have examined hundreds from affected fields, and I have not met with one for the last month in which I could not detect this evil; and in all I have discovered the same symptoms—namely, the disease first established by means of the hilum on that end of the potato, which henceforth assumes a darker color at first, for a week or two, merely on the surface. This by degrees spreads to the eye end of the potato, and it is when established there that the chief work of destruction occurs. Shortly after this, the character of bruised flesh appears; and I need scarcely add that when that takes place, total destruction follows with great rapidity. I have not a doubt on my mind that this mildew commences with the leaf, like other mildews; and breaking up the tissue there, which in the potato is extremely delicate and watery, as compared with other mildew subjects, (such as the white thorn, or the pea,) induces the gangrene, which, finding a proper nidus all the way down the stem, descends as rapidly through the stem into the potato, the cellular tissue of the interior of which afford as ready a facility for the spread of it. I examined a bog or pit, a few hours since, in a neighbor's field. I took thence 15 potatoes, the first I met with. Out of the 15 I found only three sound, and these could not hold out a week. I had some of the same age, and in the same stage of ripeness; these I mowed down, and took up the moment I perceived the mildew beginning to descend by the stem. They have now been in a potato hole for nearly a month, and I have lost probably about one-twentieth. This I can readily account for. There were one or two patches in these in which the disease was further advanced than in the rest of the plot.

It spreads by innoculation in the pits or bogs, just as mushroom or any other spawn does.

Wherever I find a suspicious patch, there are three or four potatoes gone together—never one alone. I turned the before named yesterday, and shook among them a mixture composed of equal parts of quick-lime, charcoal dust, and mere dry sand, the sweeping of a shed. The result of this I will announce in due time. If the disease is not far advanced, I should think the causticity of lime a most likely thing to stay its ravages, whilst charcoal dust, or any burnt refuse, perfectly dry, might be useful in regard to its anticeptic properties.

R. ERRINGTON.

OULTON PARK.

In my former remarks I considered the vitality of diseased potatoes destroyed, and, as regards the power of reproducing tubers, this is probably

the case; but I am surprised to find that many are making an effort to vegetate, although the eyes are surrounded with the malady. I have eaten many of the diseased tubers boiled, with the affected parts removed, and do not find that they are different in flavor from sound potatoes. In storing reds and blues great care is required, for a casual inspection will not detect bad ones; but the disease in white sorts, if dry, is observed directly. Any sort, if sound and kept dry, will remain in good condition.

Diseased potatoes over-dried, or even baked, become softened; but I imagine if large diseased potatoes are properly pared, warm air-dried, and put into fully dried sand, they will keep sound and good for use for some months. This I intend trying with good sized ones. With me the disease is worse under orchard trees than in more open parts; but in a sixteen-acre field in this neighborhood, in which electro-culture has been tried, a large proportion is affected, but not, in my opinion, so much from the conductors placed there as from the nature of the soil, which is a strong loam, holding much moisture. The disease now prevailing is distinct from scale or dry rot, the former arising from worn out soil or bad dressing, and the latter apparently from bad management in storing. This year the upper part of the haulm has been different from the usual appearance, having brown patches on it, and being inclined to wither, while the lower part is as yet not affected, and none of these are showing flower. I still entertain the opinion that electrical agency, acting through the medium of the watery stem, has been the cause of the disease.

L. S. SMARTT.

From the Gardeners' Chronicle of 25th October, 1845.

We have to state that government has instituted an inquiry into the character and extent of the *potato disease in Ireland.* Dr. *Lyon Playfair* and *Professor Lindley* have proceeded to Ireland to assist in this inquiry, at the desire of *Sir Robert Peel.* Such an official recognition of that formidable visitation, which we had the melancholy duty of being the first to announce as having manifested itself in Ireland, (page 623, Sept. 13,) renders all further details of its progress superfluous. It matters little now whether we were right in laying the loss of the potato crop at five sixths. It is, at least, certain that the injury is of the most extensive description. We believe our estimate to have been too low; but, at any rate, no question can be entertained of the mischief being such as to excite the serious alarm of the most powerful and sagacious of European governments.

Since our last, we have received all the numbers of the "Proceedings of the Institute" up to September 22 inclusive: a pamphlet on the potato disease, by Professor Morren; some continental papers; and numerous private communications. From the mass of matter we extract what seems to be of most importance, premising that, in all practical points, we find our own views adopted by those whose opinions are more entitled to attention.

In the first place, as to the fitness of decayed potatoes for food. Upon that point there is the most positive information. That potatoes actually putrid are unfit for food, is certain. But the number of tubers at present in that state is inconsiderable; the large mass of the crop has the brown gangrene of the surface, which gradually pierces to the centre. A curious and sufficiently practical experiment as to the possibility of eating such po-

tatoes without danger, has been tried by *M. Bonjean*, of Chambery, who states, in the *Monde*, a French newspaper, (for which we are indebted to *Mr. Pigg*, of Thorpe, near Norwich,) that he has been living almost exclusively, for three consecutive days, upon bad potatoes, which had been thrown aside as refuse. *M. Bonjean* states as follows:

"In order to determine the question with regard to the danger of eating the affected potatoes, I had none of the injured portions cut away from the tubers, on which I lived almost exclusively for three whole days; during which time I ate 8 pounds, with butter, in soup, or simply cooked in water, without experiencing any inconvenience except slight indigestion, a symptom which probably would not have manifested itself if the spoiled portions had been previously removed. Further, I have drunk in the morning, fasting, a glass (about 8 ounces) of water, in which 5 pounds of putrid tubers had been boiled. It was a yellowish-brown, turbid, and thick, but not viscous; of a slightly disagreeable smell, and nauseous taste, leaving a bitterness, which remained on the palate for an hour. I found no other symptoms of indigestion from this liquid, except a disagreeable heat oppressing the chest for about two hours. My two clerks and servant, observing that I felt no repugnance in eating these potatoes, and that no inconvenience resulted, followed my example next day, and were nothing worse. After stating the above facts, I hope the diseased potatoes will no longer be considered poisonous, nor in any degree dangerous when the decayed portions are removed. Anxious to know whether it was possible to save the sound portions of the tubers for use, I collected 100 pounds of such as were partially affected, from which I had the unsound portions completely removed. After this operation there remained 73 pounds of sound pieces, which I find as good to use as the finest of those exposed for sale. Hence, about three-fourths of the potatoes that are thrown away may be turned to good account; and I shall be happy if my experiments and observations tend to preserve a considerable portion of aliment, so precious to the poor, and of which they are in danger of being deprived by fatal prejudices.

"M. J. BONJEAN.

"De Chambery."

The next point is the mode of storing the crop. The universal opinion is, that the only practicable means of effecting this is by trusting to dryness, which is precisely what we have recommended from the beginning. The manner of securing a sufficient degree of dryness is different, but all agree in dryness being essential; and this must be so, when we consider that all the crop is more or less charged with water, which, in favorable seasons, the plants would have lost in the ordinary course of growth. Drying in *dark* chambers, well ventilated by means of a sprinkling of lime, or by dry earth interspersed among the tubers, are methods that have their advocates. We hold to the latter as being, upon the whole, the best plan: first, because it is easiest, and more especially because the disease is certainly contagious; *that* we have ascertained by the following direct experiment: Several sacks of apparently sound bread fruit potatoes, ten days since, were placed in a dry stable and covered with mats, for the sake of seeing whether they could be so kept. On uncovering them, a large proportion were already exhibiting the mouldy appearance which invariably

accompanies the disease. We have no doubt that the air is impregnated with the seeds of the fungus; that whenever it falls upon a decaying or injured surface it takes root, provided the vitality of the tuber is low; that the vitality of all potatoes from diseased districts is low this year; that, moreover, they are all more or less injured (necessarily) in the operation of digging, and that, consequently, they all offer a favorable situation in which the fungus can propagate itself. Now, if potatoes are placed in dry rooms, or packed in any other way so as to allow air to circulate among them, the seed of the fungus will reach them.

The last point to which we shall advert is the course to be taken with the seed next year.

It is clear, from the following very important communication from Mr. Grey, of Dilston, that autumn planting answers perfectly. We should, therefore, adopt that mode of cultivation at once.

COMPARATIVE PRODUCE OF AUTUMN AND SPRING PLANTED POTATOES.

Your number for November last contained the detail of an experiment which I made last year on the growth and produce of potatoes planted in October and in April, the result of which was, that the plot planted in April, on the same land and with the same manure as the other planted in October, gave 86 loads per acre—the seed having been from large potatoes cut in two—and that planted in October, with the like seed, gave 111 loads; whereas small potatoes, planted whole in October, gave 100 loads.

In October last I prepared my land, and planted my potatoes in drill rows of 30 inches width, applying fold-yard manure below the sets, but leaving three rows unplanted for each intermediate month between October and April, inclusive. The land is a strong loam, except at the upper end, where it touched for a few yards upon clay, in which the potatoes failed to a great extent in all the plantings. At the low end of the rows, the land is good and perfectly uniform. The manure and treatment of all were alike in every respect, except as to the times of planting. This year I did not apply guano in the spring, as detailed in the experiments of last year. None of the potatoes have been affected by disease; but the earliest planted showed the greatest strength and vigor in the stems, although there were occasional vacancies in the rows. The land was all drilled up in October, at which time the largest part was planted. Three rows more were dunged and planted in like manner in the end of November, and three in the end of December. In January and February the weather was so bad, and the frost so hard, that no planting could be accomplished. Three rows more were planted early in March, and the remainder of the land at usual time of planting in April.

The potatoes have been taken up within the last three days; and, to test the comparative produce of the several plantings, my man began at the low end of the rows and dug onwards till he had filled a sack which contains ten stones weight. The contents, however, is immaterial, so long as the same sack was used for all. The average length of the drill rows required to fill the sack—

Of October	planting, was	30	yards,
Of November	do	32	do
Of December	do	32	do
Of March	do	44	do
Of April	do	45	do

which leaves to the October planting an increase of one-third over that of April; a result not very different from that of last year, in which the quantities were 111 to 86. From this it would seem that it does not much signify at what period in the winter potatoes are planted, provided the land be free and dry, and the weather suitable for working it; but it is evident that a loss of power is sustained by allowing the seed to remain in pits till the spring, under a slow process of vegetation, when, before being used in the field, considerable shoots have already been put forth, wasting the nourishment which is requisite to sustain the plant in its early growth, and before it begins to derive its support from the soil. A few more such experiments may tend still further to elucidate this important subject.

JOHN GREY.

Dilston House, *October* 16.

If small sound potatoes, or such as are very slightly affected, are now exposed to the light, they will rapidly become green, and their vitality will be so much raised as probably to enable them to resist all decay. If such greened tubers are cut into sets, they should be sprinkled with powdered lime, or otherwise dried by exposure to air for two or three days, and then planted. Of course, in a case of this kind, where every thing is new, it would be unsafe to affirm that this process will be effectual. But it holds out so good a prospect of success, that we do not hesitate to recommend its immediate adoption. It has, also, this advantage—that if it should fail, potato fields can be again planted in the spring.

It will be well to select for the crop new ground; and, if possible, high, dry situations. But while we state this as a matter of prudence, we have no confidence in its necessity. Our own opinion is, that if sound seed are used, no fear need be entertained of the mischief appearing another year.

After giving this subject the most serious attention, we can arrive at no other conclusion than that the disease is to be traced to the peculiar circumstances of the season—that is to say, to atmospheric causes, and to nothing else; that the mischief produced by the mildew fungus is quite a secondary circumstance, although probably a serious aggravation of the original mischief, and that nothing is to be feared from it hereafter, unless the same atmospheric conditions should occur.

CAUSE OF THE POTATO MURRAIN.

It appears to me that the disease primarily attacks the stem, and I think the view I take of the subject holds good in some cases, if not in all. I maintain that it is a disease of the fluids: the descending sap becomes poisoned by the generation of unwholesome gases in the stem; from the excessive moisture prevalent through this season, the proper exhalation of the plant has not been carried on; thus, we find that the stem undergoes decomposition instead of gradual decay, and this deteriorates the descending sap, which, passing to the root, poisons, as it were, the tubers. My own potatoes, which were planted on new ground, on a very steep slope, are not in the least affected. Where they were grown on higher ground, the

tops died early, and the tubers are as healthy as possible. Before the last rain I dug about a rood, both from the lower and higher ground, and all were equally sound. A few rows remained, which I was prevented by the rain from digging up: these I have since gathered, and they have shown symptoms of disease; the tops were fine; but after the rain, they were all matted together. During their growth I never saw tops have a more luxuriant appearance; clear and fresh, with nothing like specks on the leaves or stems.

Another thing which causes me to consider the sap as poisoned, is the great rapidity with which the tubers decay. They appear healthy, from all outward appearance; still, in many cases, if they are stored away, the specks are manifest—first, of a dingy hue, then darker colored, and afterwards becoming soft and rotten. Had the leaves or stems of my potatoes shown any sign of specks, I would have pulled the stems out of the ground, leaving in the tubers awhile before I dug them up; this would have prevented any bad effect from a deteriorated sap. A proof might be obtained by comparing the analysis of an unsound potato with that of a sound one. I think we should find, at any rate, the ultimate elements to be in different proportions to what is usual.

A. B., *M. R. C. S.*

The potato disease appears to be similar in nature to the smut and other diseases that affect wheat. Is it not, therefore, probable, that the same remedies that are found effective to preserve wheat may be advantageously employed in the case of potatoes? Experience has shown that certain steeps (blue vitriol, for instance) effectually prevent the ravages of smut. I would, therefore, suggest that the experiment should be made, whether soaking potatoes intended for seed in solution of blue vitriol might not probably destroy the vegetative power of the fungus on the potatoe, without affecting the vegetative power of the potato itself. Of course, the poisonous nature of blue vitriol makes this suggestion inapplicable to potatoes intended for any other use except for seed. I cannot help being strongly of opinion that the disease is not of such recent origin as is commonly supposed. Any one who will examine the columns of the *Chronicle* many months before the harvest of 1845 was begun, will find numerous complaints of partial failures of the potato, and suggestions as to the cause. I think it is now scarcely possible to doubt that the same cause was then in operation which has since produced such terrible effects.

I know two instances, in 1844, in which nearly the whole crop was worthless; and, though I have had no particular description of the appearance of the potato, I do not doubt the disease was the same as has since become so prevalent.

P. P.

It is worthy of remark, that whereas Mr. Paxton considers the disease to be "principally confined to what are called the early potatoes," in this neighborhood the early crops were as good, if not better, than usual. When attention was first called to the existence of the disease, I thought it ad-

visable (as a precautionary measure) to take up a considerable quantity of the early kinds for seed, although they were scarcely ready; and after being properly dried and "greened," they were carefully stored, and are still perfectly sound and good. I find that the pink-eyed varieties are much more susceptible of infection than the white and rough skinned kinds.

J. L. SNOW.

BEDALE.

To the Editor of the Morning Herald:

SIR: The disease in the potato crop having become so general, and the results so disastrous to the community, will, I trust, be my best apology for offering to the public the results of my chemical experiences to endeavor to neutralize the ravages of this lichen in the plant. The disease presenting a similar appearance to the *porigo lupinosa* in the human scalp, induced me, by analogy of treatment, to try the effects of mild alkalies, which succeeded only to a partial extent, but sufficiently to encourage me to employ a solution of caustic soda, and this I found invariably put a stop to any further progress of the parasite vegetation; consequently leaving the potato in a sound, healthy state, and fit for food.

The method to be used is simply to prepare a solution of caustic soda, equal in density to 8 degrees of Beaumé, and immerse the tubers for about half an hour; then drain and thoroughly dry them by exposure to the sun and air, and store them in chaff or cut straw.

I am, sir, your obedient servant,

A. LINDA.

ST. HELIER'S, *October* 25.

To the Editor of the Morning Herald:

SIR: I have to request the favor of your giving insertion to the enclosed letter of Mr. Tattersall, of Grosvenor Place. Chlorine is easily made by mixing three parts of salt, one of manganese, and two of oil of vitriol, in an earthen vessel. Many bushels can be disinfected at an expense of a few shillings.

Your obedient servant,

HENRY REECE.

MEDICAL HALL, 168, *Piccadilly.*

"GROSVENOR PLACE, *October* 23.

"DEAR SIR: I examined the potatoes submitted by you to chlorine, and then kept in a warm, dry place. The potatoes were from my farm at Willesden. When the crop was first taken up, more than one-third of them were thrown away as good for nothing. Soon after, the others began to decay. Those sent to you were all infected with the prevalent disease; they are now completely healthy. In one, where the disease had previously destroyed two-thirds of the potato, the decay had been stayed; a clear line of demarcation was established between the healthy and diseased portion,

which had quite dried up; the bad smell was entirely gone. The potato, when cut open, was sweet and healthy, though the entire portion which the disease had spared could not have been a third.

"The remedy is so cheap and simple, and a large quantity may be cleaned with so little trouble, that I think it ought to be made known to the public. I placed my potatoes in three layers on hurdles in a close room, and then applied the chlorine. With many thanks for the trouble you have taken,

"Believe me yours truly,

"E. TATTERSALL.

"H. Reece, Esq."

THE POTATO DISEASE.

To the Editor of the Norfolk News:

Sir: A person in this town had accidentally left a potato last spring in the corner of a closet in his house, which the other day was found with *seven small potatoes* attached to it, and *five out of the seven are spotted with the murrain*, so fearfully prevalent throughout the Kingdom. It must be something more than excessive wet, or cold, humid atmosphere, which occasioned this evil, for they grew in a perfectly dry place.

Yours, &c.,

GEO. JULER.

North Walsham, *October* 30.

THE DISEASE IN THE POTATO CROP.

To the Editor of the Morning Post:

Sir: A circumstance has occurred here, which may perhaps be useful to farmers if they should again be visited by this disease. On the first appearance of the complaint in the potato haulm, a small field belonging to the Rev. Mr. Sergison, of Cuckfield Park, adjoining the church-yard, showed indubitable signs of being attacked. It was almost the first piece that was affected, and, as it had been planted with potatoes for twenty-eight successive years, it was supposed to arise from the continuous cultivation of one species of root. As the fence dividing it from an adjoining meadow was only a double post and rail, a quantity of two toothed sheep that were turned into it after mowing broke into the potatoes, and fed off the haulm, eating it off closely, with the exception of the upright or main stalk.

This was supposed at first to have done some good in staying the disease; but, as the stalks were closely shaved and shortly died, no more was thought of it until last week, when the potatoes were lifted, and found, with the exception of a few that were rotten in the ground, and a few bushels that showed signs of having been attacked by the disease and were in a state of decay, to be perfectly sound, and in a fit state for storing.

The ground is of dry soil, of a sandy loam, and the potatoes planted were of the Shaw variety.

This goes far towards proving that the disease originates in the haulm, and demonstrates the utility of feeding off or cutting it when first attacked.

It was the only piece of backward potatoes that has escaped in the neighborhood.

As I have long been a subscriber to your entertaining and useful paper, I have sent you the above, to insert or not, as you may think proper.

Yours, &c. &c.,

S. SERGISON.

CUCKFIELD PARK, SUSSEX, *October* 31.

THE POTATO DISEASE.

To the Editor of the Times:

SIR: I regret that further observation of the pared and sliced potatoes I mentioned in my speech at Birmingham, in which, for a few days after I had dried them in the sun and air, the growth of the fungus seemed stopped, has convinced me that the disease is again going on; so that unless the slices be made as dry as biscuits, in a slow oven, or on a fire or malt-kiln, at a heat sufficient to kill the fungus, its growth will go on, and destruction of the potato follow.

I see it recommended to steam or boil all potatoes in which the smallest speck of decay has appeared, and to ram them down air-tight in casks, or large jars or pans, covered over at the top with a layer of fat, to be kept like potted meat, for use during winter, and stored in a dry place. This seems to be the easiest mode of preserving potatoes in every stage of decay short of absolute rottenness.

I yesterday asked some eminent machinists to contrive a small and portable boiler, by which steam may be introduced to the bottom of casks set on end and filled with potatoes. They suggested that a Papin's digester, having a small lead pipe fixed in the centre of its lid, may be inserted into casks of every size, in which a false bottom of wood should be placed under the potatoes, at a few inches from the bottom, sufficient to allow free passage to the steam. A similar lead pipe may be fixed on the top of any large teakettle or common boiler; and if this top be tied down with wire to prevent its being blown off by the steam, this steam will fill the cask, and in the usual time boil or steam the potatoes, and, killing the fungus by heat, will stop its further progress.

The fungus matter thus boiled is wholesome and nutritious, being not a putrid substance, nor a murrain or gangrene, but only another kind of vegetable, formed from the substance of the potato, and, like eatable mushrooms, is good for food.

It is only where the potatoes are absolutely rotten that I would advise the preparation of starch, which alone remains after all the membranes and tissues of the potato are consumed by fungus. This may easily be done by crushing, stirring, and washing the pulp several times in tubs of *cold* water, in which, at the end of every stirring, the starch will separate from the pulp and fall to the bottom of the tub.

I think that steaming in large casks, or boiling in the common way, where there is no contrivance to make steam, is much better than grating the decayed potatoes in any stage short of rottenness; when they are rotten, the starch still remains, and is all that can be saved.

The potatoes thus steamed or boiled may be stored in casks of any size,

from sugar hogsheads to butter firkins, and a little salt should be sprinkled on the potatoes as they are put into the casks; but it is essential that they should be *rammed quite close and air tight throughout*, and that the top and bottom of the casks, and every joint and crack, should be rubbed over and filled with grease or pitch. If this be done, the potatoes will keep like meat and vegetables potted in air-tight tin cases, which are sent to India and back quite fresh.

Where there is time to pare the potatoes before steaming or boiling, this should always be done, and the parings, *boiled*, given to hogs and cattle.

As large potato steaming vessels exist, or may in a few days be placed in all the union houses in the country, the inmates may be most advantageously employed in steaming and ramming potatoes into casks, while the inhabitants of each neighborhood are occupied in bringing their potatoes and empty casks, and carrying them away full of food thus rescued from destruction.

I am, sir, your obedient servant,

W. BUCKLAND.

OXFORD, *November* 7.

P. S.—It is essential that the casks or pots be kept in some place *perfectly dry*. Where cottagers have no such place, farmers and proprietors will assuredly lend them lofts or barns, or stables or outhouses.

From the Preston Pilot.

THE POTATO CROP.

An intelligent correspondent, who has bestowed considerable pains to ascertain the state of the prevailing disease in potatoes, has favored us with the following results of a promiscuous survey or inspection of the potato crops in the townships of Woodplumpton, Broughton, Barton, Inskip, &c., and gives the following cases:

1. An old ploughed field, planted with varous kinds; about a tenth part of the whole very rotten. Had this crop proved sound, the produce would have been an average. Soil of a hazel nature.
2. A newly broken up field, usually called "Ley Backs," well drained, and well cultivated. Soil between hazel and black, planted with "kemps," an early sort. About one-third rotten, and the remainder rotting fast after dug. Had all been sound, this crop would have been a deficient one.
3. A very old ploughed field, say thirty to forty years. Soil rather black, planted with early kinds. Manured with guano. All, or nearly all, sound; but rather a light crop.
4. A nice dry croft, ploughed a few years. Soil very free and black, and very clean from weeds; planted with "blues," and half rotten.
5. A good field. Soil, "bastard black," well manured and cultivated. Many kinds, but mostly "blues" and "jackies," or "cups." Greater half gone, and the remainder going fast.
6. A high and dry bed, delved in a meadow. Kind, "jackies." Nearly all rotten, and bad in every respect.
7. An old broken up field. Soil, hazel. Many sorts, and nine-tenths rotten.
8. A very stiff, heavy, wet soil. Two and a half acres, planted with

"Kendal Kemps," "blues," and "Royal Georges." The return good, and all free from disease, excepting a few of the last named description.

9. Excellent land. Soil of a fine, free, black nature, particularly well manured and cultivated. This was by many considered the most flourishing crop in the neighborhood. A great deal prove rotten, and altogether deficient.

10. Two acres. A newly broken up soil, of a blackish nature, and admirably cultivated. Crop fair, and about one-twentieth part rotten; the rest going so fast, the farmer is selling them off at 2s. 6d. per load.

11. Fine free soil, broken up four years ago. When got up, sound to appearance, but the disease destroys them immediately afterwards. Planted both early and late kinds.

12. Fine, dry, sandy soil, in excellent heart. Sound when gathered; but selling them as fast as possible, from fear of their all going rotten, as he can pick out a great quantity every day beginning to look black and wet. Before either the wet weather or frost came, this farmer got up a quantity, thinking of their being seed next year. He had them dried, greened, and well hogged; and on examining them, he found every potato more or less affected.

13. High, dry land, near a railway, commonly called "Spoil Banks." Sound to appearance, but fully expected to go bad.

14. Very old "foughten" land, well manured and attended to. Planted with early kinds, and many going rotten.

15. [This gentleman is a sientific and practical agriculturist.] Dug up part of an old meadow near to a brook; manured one part with his own midden dung, and the other with night soil. The drills were made with the spade, and the manure put in at the time. Planted many kinds—amongst the rest, half a load of "Kendal flat reds." These he planted whole sets, excepting a few from which he cut a small piece from the haulm or tail ends. He then shook them up in a sack containing gypsum; and when he planted them in the drills, he put some more gypsum upon them, previous to covering them up. He has not more than threescore pounds back from the half load, the remainder being rotten. The other kinds were also diseased. He also planted some new sort, raised by himself from crabs, two years ago; and finds the produce neither greater nor sounder than from old seed. He dug some "lemon kidneys" early in the season, for seed another year; and on examination, finds them going rotten.

From the above cases, he makes the following remarks: It does not appear that the crops in old, hard-worked soils are any worse than those in fresh broken up fields, although this is contrary to all precedent and experience. It also seems that the black, free, sandy, or likely soils, have not done any better than the stiff, clayey, or unlikely grounds. There does not appear to have been any want of care and attention on the part of the farmers, either as regards draining, manuring, or keeping weeds down. In some of the crops of early potatoes, the leaves dropped from the stems early in the season, the stems keeping their erect position, but assumed a yellowish appearance, an evident sign of the disease having commenced its ravages. This was not the case with the backward crops, which maintained their freshness and vigor until cut down by the frosts. Taking the Fylde district through, it may be safely asserted that fully one half are now completely rotten; and it is generally considered the remainder will not keep.

ANSWERS TO QUERIES.

To the Rev. A. M. Forrester, minister of the parish of West Linton:

The general crop has suffered to a certain extent in almost every instance from the prevailing disease, both by rotting in the ground and after being raised. It is worthy of particular remark, that in many instances, where lifted early in small quantities for use, *and before the decay of the shaw, or foliage more particularly*, the portion of the crop so lifted appeared, and proved, on cooking, to be perfectly sound and healthy; whereas, on lifting the remaining portion, *in the same field*, some time after the shaws had decayed, they turned out to be tainted, like the general crops of the country. However, by being housed, and frequently aired by the door being left open, and in pits, care being taken to lift off the covering every good day, for a while, to air and dry the mass, under both these plans of treatment the disease appears to have been at all events temporarily arrested.

It is also worthy of remark, that on hanging land, looking north, and where the crop was late planted, and in vigorous growth till near the period of lifting, having thus enjoyed the protection of the shaws, a foliage covering, which aided materially in defending the tubers from the heavy rains, acting in some measure as a natural roof, casting aside the wet into the furrows, they turned out, upon lifting, to be scarcely affected at all. In this instance, not only did the shaws cast off the rain into the furrows, but the land having a considerable inclination, the superabundant moisture escaped by the furrows to a lower level, leaving the surface and crops comparatively dry. But even here, wherever the superabundant moisture was collected in any slight depression, or hollow, the disease appeared to some extent.

In another instance, on undulating land, the depressions forming natural cups, or basins, retaining the water as it fell, and affording no means of escaping, *in the same field* the potato crop was excessively damaged in these natural hollows, whilst the more elevated or shelving parts were comparatively unaffected. In one instance, however, the crop raised off dry land was stored in pits early, and, on opening the pits, the potatoes were found to be a decaying mass. In this instance, however, the crop was raised in very wet weather, stored wet, and of course in bad order for keeping sound.

In another instance, a portion was raised in a field soon after the decay of the shaws, when a very considerable number indeed appeared to be diseased; sometime thereafter the number increased; and within a week, and after the heavy October rains, *when the crop had ceased growing, and had been for some time exposed without the protection of the shaws*, more than a third of the crop was found to be damaged. After raising, too, the loss was considerable, although the diseased tubers were carefully separated.

On dry and level ground, *with an open bottom*, the loss was not so great as under less favorable circumstances. On level ground, *with a retentive sub-soil*, the loss was great. On inclined ground, *where the crop was late planted*, and *particularly if inclining to moss*, the loss was often inconsiderable.

It would appear that the potato crop had this year suffered severely from the cloudy and extremely cold and wet season; the temperature, especially in high districts, frequently bordering on frost, so early as from the latter end of July to the end of August, and subsequently; and the white and most delicate kinds have suffered most. Such a season was ill adapted for bringing this crop to maturity (scarcely a seed apple having appeared in this local-

ity during the past season,) and was undoubtedly eminently unsuited to the constitution of the potato plant, derived as its original was, and acclimated, from a dry and sunny country. This is undoubtedly the cause of the prevalence and severity of the *rot*, which is the disease affecting the present crop. There is, therefore, no such cause for serious alarm; on the contrary, there is every reason to expect, if the tubers are planted next spring which shall have resisted decay during the ensuing winter, and if next spring, summer, and autumn should prove warm, sunny, and dry, and propitious to the maturation and storing of the potato crop, that the produce will, despite the present visitation upon us, prove sound and abundant. There is no rational reason for anticipating the contrary. I do not apprehend there will be the slightest danger from using tubers for seed, which shall have resisted decay during the winter. It has been ascertained that the potato crop is not affected in the more warm and sunny countries of Europe, which is a pretty convincing proof that the cold and cloudy skies which have prevailed over great parts of Europe and America during the past season have been, along with any accidental constitutional weakness in the plant itself, the predisposing and active cause which has generated, extended, and aggravated the disease of rot, depending, or rather resulting, in a great measure, in active, followed by putrefactive fermentation, before lifting, or consequent on storing, more particularly where that operation has been carelessly or improperly performed.

No doubt *after decay of the shaw* the chief damage has been received. It would then, *at least*, daily become more apparent; and may be, so far, familiarly accounted for, as it has been found to operate thus. *In the first place*, so long as the potato crop retained the shaws, or haulm, it was in vigorous growth, and was capable of resisting the unfavorable influence and action of superabundant moisture during the late wet season. *In the second place*, the shaws acted as a protection from the rains, as I have already said, casting them aside into the furrows, leaving the cup, *where perfectly earthed up*, high and dry above. And, *in the third place*, it may be remarked, that on the decay of the foliage covering of the shaws, not only were the drills left exposed, but from the extraordinary prevalence and violent action of the high winds, accompanied by heavy rains during the late season, cups or small depressions were formed on the top of the drills, *at the root of every shaw*; and the interstices or openings left, *on the decay of the shaw*, leading from the surface of the drills down to the tubers, and forming, in fact, natural pipes or conductors *from the several cups formed on the surface down to the tubers*, would act in this way. The cups would *receive the rain-water as it fell*, and the pipes, *left by the decay of the stems*, *would conduct* the moisture received and collected in the cups *directly down to the tubers*, and keep them constantly wet; and they have thus been lying, since the decay of the shaws, in *the very circumstances, and under the very conditions, and exposed to the very influences*, most favorable for inducing rot, which is, without doubt, the only disease with which the potato crop has this year been so severely affected. No doubt, as I have already said, the sets might have been predisposed to disease; because, so to speak, the constitution of the plant has been for some years deteriorating in the country. But had the late season been a genial season, as it was the reverse, the probability is, that the injury would have amounted to nothing more than has been usual in an average of past seasons.

The progress of the disease has not ceased or abated, *where the tubers*

have been stored wet, or in bad order, or without reasonable precautions. Few attempts at remedy have been ventured. But I would remark, generally, that when housed, where there is the necessary accommodation, the tubers should be examined frequently, picked carefully, and where obtainable with little trouble or cost, they may be beneficially sprinkled with gypsum, slacked lime, dry peat ashes, or even with the roughly dried sand; and though exposed with the doors open for air during the day, they must be carefully covered with abundance of straw, and the doors shut during the night. The use of *either of the first three substances* will have a very excellent and healthful effect in preventing the noxious gases arising from the mass injuriously affecting the individuals employed in picking, sorting, and turning the tubers. * * * It would appear, from all experience, that *perfect dryness and thorough ventilation are the only efficient attainable remedies or curatives, or preventives.* * * * It has been remarked elsewhere, however, and observation in this locality seems to confirm it, *that a soil of bog or peat earth,* very prevalent in this quarter in particular localities, *seems to have a very decided and sensible effect in preserving the crop free from the prevalent disease. This may be of great importance next spring at seed-time.*

I am, dear sir, yours truly,

JAMES ANDERSON.

22 Hill st., Edinburgh, *Nov.* 10, 1845.

From the New York Farmer and Mechanic.

NEW YORK FARMERS' CLUB.

In the County Cork Agricultural Society, of which Lord Barnard, a member of Parliament, is president, this subject [potato rot] was recently considered. Prof. Allman spoke of the deep anxiety felt on the subject, and of his examinations made by powerful microscopes. He says that he was enabled to see the organic arrangements of the potato by cutting off a thin transparent portion, placing it on a bit of glass, laying a drop of water over it, with a small portion of the tincture of Iodine, covering it with another bit of glass, and using a microscope of *three hundred lineal magnitude* A quantity of starch would be detected lying on its cells, and the starch globules would be seen in their exact proportion, and would be colored by the Iodine. The starch would be seen distinct from every other substance in the potato. It would be seen that the healthy cells were full of starch, while the diseased potatoes were very deficient. The disease appeared to prevent the formation of starch in the young potato; and when it attacked the old potatoes, the starch being already formed, might be extracted for food. He recommends grinding up the potatoes and extracting the starch.

John Dillon Croker—Had examined disease in England, and was "horror-stricken, on returning to Ireland, to find that the angel of destruction had smitten the crop of this country." Some had said that the severe frost of the 7th of September had been the cause, but he had dahlias, geraniums, and French beans, which were bright and green, while the potatoes were gone; frost was out of the question. He had put some potatoes into scalding water by way of trying an experiment, but in these the plague-spot showed in an hour, and the potatoes rotted rapidly. He said that we must get the starch out; that the starch in the diseased potato was just as good as in the sound ones. He said, "Let Ireland from henceforth become a

consumer of good wholesome *breadstuffs.*" He said the starch of the potato could be eaten as we eat arrow-root, and what we get from the shops by that name is made generally of *potato flour*, and which is passed off under a dozen names as an important and nutritious diet.

Mr. Smith, of Layham—Had extracted from five bushels of bad potatoes thirty pounds of flour, and had refused to sell it at sixpence a pound. A bushel of potatoes would yield eleven or twelve pounds of flour.

In Kilkenny and Athlone, potatoes were produced weighing from two and a half pounds to *five pounds* each, and there was no disease in them.

A mode of preserving potatoes from disease after being dug, is recommended, viz: sift in lime over them until every potato is coated.

Some districts are free from the potato plague. It is said that the *white-eyed* potatoes have escaped the disease almost entirely.

It is stated that the *apple potatoes* are *not one-fifth of them sound;* the *dukes* nearly as bad; the *cups* pretty safe; and that the only potatoes which have escaped entirely are some *early Scotch;* that the *kidneys* are pretty free from disease; that the potato disease is contagious; that the healthy ones must be carefully separated from those diseased.

PRESERVATION OF THE POTATO CROP.

To the Editor of the Mark Lane Express:

I first fix upon a piece of ground as high and dry as I can select. I then mark out five feet in width, and of any length that may be required, cutting a trench round the same, and with the excavated earth still further advancing the ground wheron the potatoes are to rest. Upon that bed I spread a thick layer of clean dry straw, on which is put a thin layer of potatoes, as free from dirt and loose moulds as I can conveniently make them; then another covering of straw, succeeded by a second layer of potatoes; on these I place rows of rough tiles, two feet apart crosswise—that is, from side to side—by which flues are formed for the escape of the damp; and thereon I advance the hill with potatoes to any height that may be found convenient. Such being effected, I again resort to straw; but stubble, thin-pared sods, or any similar material, would answer the purpose nearly as well, which I spread pretty thickly over the whole of the potatoes, and then cover them down with earth for the winter. To prevent damage being done by the frost, I plug up the ends of the tiles every night with wisps of hay, removing them every morning, which should be attended to until the potatoes are found to be in perfectly dry condition. I lately opened a pie wherein I had put promiscuously, on the above plan, potatoes damaged and sound, wet and dry, which had been covered down with earth nine days. To my great satisfaction, I found the potatoes quite free from heat, much dryer than when stored, and those which were diseased in a far more healthy condition, the damaged parts having changed into dust, the wounds having become in a great measure incrusted over, and apparently, from the best judgment I could form of them, likely to prove good and wholesome food for man, and fit for seed next spring. In reference to the tiles being placed upon the second layer of potatoes, I would observe that they may be passed through any part of the pie which might be thought likely to admit of a greater portion of atmospheric air; for, in my opinion, it is the free circulation of air through the whole mass of potatoes which acts so beneficially.

Should no straw be at command to put at the floor of the pie, I would recommend tiles, as has already been described, being placed across the same at the top of the raised foundation. These, I have no doubt, would be sufficient to prevent any damage being done to the potatoes by the damp of the natural earth.

I am, sir, your faithful servant,

WM. SKIPWORTH.

SOUTH KELSEY, *November* 15.

The following practical statement, made by Mr. Croker at the meeting of the Cork Agricultural Society, is very valuable, as it may be adopted with facility in any family:

	Farina, or flour, dry and fit for use. lb.	oz.	dr.
One weight (20 lbs.) of sound white potatoes will produce	3	9	0
One ditto unsound, and diseased part cut off	3	1	0
One ditto unsound minions	3	1	0
One ditto unsound and paired	3	0	0
Unsound, none cut off	3	6	0

Diseased potatoes, useless, quite soft, and rotten, will make as good starch as the soundest, and need not have the bad parts cut off; let care be taken to have them well washed, to prevent earthy particles mixing with the flour. He would give accurately what the six loaves of bread produced are composed of, the cost of each, and the weight, by which it would seem that actually the people had it in their power, at a trifling expense, to procure from diseased potatoes a far better description of food than that they had heretofore been using; and he trusted that what was considered the greatest calamity that could befal them may prove to be a rich blessing, viz: the change of diet from potatoes to bread.

No.	What composed of.	Price of wheaten flour or oatmeal.	Weight of loaf.	Price.
1	One pound fine wheaten flour, and one pound of farina.	18*s*. 8*d*. per cwt., or 2*d*. per lb.	2 lb. 10 oz.	2¼*d*.
2	Half a pound of fine flour, and one pound of farina.	18*s*. 8*d*., or 2*d*. per lb.	1 lb. 10 oz.	1¼*d*.
3	One pound of household flour, and one pound of farina.	15*s*. per cwt., or about 1½*d*. per lb.	2 lb. 13 oz.	1¾*d*.
4	Half a pound household flour, and one pound of farina.	Do. do.	2 lb. 15 oz.	1*d*.
5	One pound of oatmeal, and one pound of farina.	13*s*. cwt., or less than 1½*d*. per lb.	2 lb. 5 oz.	1¾*d*.
6	Half pound of oatmeal, half pound of household flour, and half pound of farina.	14*s*. per cwt., or 1½*d*. per lb.	2 lb. 0 oz.	1¾*d*.

Remarks.—The cost of soda, sour milk, and salt, is included, but no allowance for fire, as the potatoes, if sound, should be boiled, taking the same quantity, if not more, than baking the bread.

The proportions were, for the above loaves a small tea-spoonful of soda, the same as salt, which must be very well blended with the flour or mixture, after which it should be let lie, wet, and worked up with sour skimmed milk, or buttermilk—the latter he preferred; and the longer kept, the better, as the sourer the milk was, the more it acted on the soda and made the bread rise better. As all country-women know how to make potato-starch, he need only say to them, provide at once a good grater or two, and set to work on the unsound potatoes. Keep your families constantly employed in picking out the diseased ones, thus securing an ample supply of the best food from this description, when the starch is sufficiently washed.

From Frank & Millard's Commercial Traveller.

After making considerable allowance for the exaggeration which usually attends statements calculated to create alarm, it seems absolutely certain that a disease has very extensively shown itself among potatoes of the present year's growth, and that the effect of it will be to reduce the crop very far below an average, and in some districts to create considerable difficuly, if not actual starvation and distress.

It becomes, then, a matter of no ordinary importance to determine by what means such an evil may be prevented for the future, as well as mitigated in its present operation.

The disease itself, in plain language, may be called the "rot," and is found to exist more or less at all times, but, of course, it only excites public attention when sufficiently extensive as to become a public evil. The existing cause of it, the writer believes to be an excess of cold and moisture. The potato is a vegetable which naturally absorbs a vast quantity of water, and, when supplied with this element in excess, it requires a proportionate degree of warmth to enable it so to assimilate the moisture it has imbibed as to convert it into a healthy substance; and in case of its wanting the degree of warmth necessary to stimulate its secreting organs into a due state of activity, it will become subject to morbid formations, and these, unless means are adopted to prevent their development, will sooner or later show themselves by that corruption, or rottenness, which, during the present season, has been so prevalent. This disease, then, sustains to the potato a similar relationship to that of scrofula to the human body; and, like this scourge of the human species, it may be considered as partly resulting from constitutional defect, and partly from external causes. Among the various opinions which have been hazarded respecting the causes of the malady, some have supposed the existence of an external "blight," by which the tubers have become ultimately affected; and others have talked about "fungi" upon the tubers, by which they have become diseased. The writer believes that the plant has become diseased through the unhealthy state of the roots or secreting organs, and that the "fungi" have resulted from the disease, and not been the occasion of it. What, then, are the likeliest means for preventing the malady in future? As far as weather

is concerned, it is clear we can do nothing but to submit to whatever may happen. We can neither command the sun to shine, nor dispose of the drops of rain, nor order the courses of the winds. Still, much remains in our own power, and which may be all summed up in a few words: the true secret of success in growing potatoes, as well as other vegetable productions, is *to sow good seed in good ground;* and whenever this simple and rational rule is neglected, there will most assuredly be more or less of loss and disappointment.

With respect to *soil*, the potato delights in that which is moderately light and porous, which points out the necessity of draining all heavy and wet lands, if they are expected to grow potatoes. In the next place, the potato requires a frequent change of soil, and on this account heavy crops are usually produced on newly broken up lands. In kitchen gardens and cottage allotments, where the root is grown year after year on the same spot, this necessity is in some measure provided for by the large quantity of fresh manure which is commonly used. Extremely favorable seasons will counteract, to a great extent, the disadvantages of the soil; but no man has a right to expect a large and healthy crop who plants his seed in land exhausted by frequent cropping, which has not been well worked by the spade or plough, or which is retentive of cold and excess of moisture.

With regard to *seed*, common sense tells us it ought to be in the highest state of perfection in which it can be obtained, and to such perfection the writer considers the following items indispensable:

1. *It ought to be whole.*—The practice of cutting potatoes into pieces for seed, leaving one or two eyes in a piece, cannot be too strongly deprecated. The result of repeated experiments has unanswerably proved that the plan has nothing to recommend it but a penny-wise and pound foolish economy. It is true that every eye possesses the germ of a perfect plant, the same as the eye of a dahlia; but every cultivator of this flower knows that, although he may get a well-formed plant, and handsome flowers, from a single eye, or the cutting of a dahlia, he only gets a good crop of *roots* from a perfect tuber. The grower of potatoes wants roots, not flowers, and to secure these let him plant whole potatoes; and for many reasons, into which the writer cannot now enter, he will find it answer his purpose better than cutting them.

2. *It ought to be in a state of maturity.*—Unripe seed is necessarily deficient of the vigor requisite to put forth and sustain a healthy plant; and, as we have already shown, whatever is a cause of weakness is a predisposing cause of disease. This is as true among vegetables as animals; and in regard to the latter, no one ever thinks of disputing it. The potatoes for planting should, therefore, be selected when the stalks have decayed, and not sooner.

3. *It ought to be of medium size, and well formed.*—The writer has ound that, on the whole, potatoes of the size of hens' eggs have produced ne neaviest crop out of a given weight of seed. He would, however, prefer *sets* much smaller, if ripe, whole, and well formed, to pieces cut from arge potatoes. The overgrown tubers should always be rejected, as containing an excess of moisture; whereas the strength of the future plant resides in the solid part of the root.

4. *The potato should frequently be raised direct from the seed contained in the potato apple.*—Every sort of vegetable propagated in the way potatoes are usually produced is liable to degenerate; and in propor-

tion to their degeneracy, they become liable to disease. Many sorts of potatoes once in common use, have become completely worn out, and their names are almost forgotten; and the writer has little doubt that much of the disease and failure which every year, and in unfavorable seasons in particular, attends the potato crop, is owing to sets being planted which are too far removed from the original seed. The vegetative principle has become too feeble to give existence to a healthy and vigorous plant; and the consequence has been those diseases to which there has been a predisposition, or which the soil or season has been calculated to produce.

5. *It ought to be well preserved.*—The best of seed may be injured by bad management; and, although potatoes will stand much rough treatment, like all things possessing life, they cannot be injured with entire impunity. When taken up they should be exposed to the air for a few days to dry and harden, by which means they will be less liable to shoot before the time of planting; they should then be stored away and effectually guarded against frost and damp. A worse plan cannot exist than allowing the potatoes to shoot, and, after pulling off the shoots, to plant the potatoes for seed. The man who is guilty of such folly deserves to lose his crop for his pains.

Much more might be said on the growth of this valuable root, but the experience of the writer justifies him in saying that, if the few rules he has here laid down were but generally observed, the same quantity of land which is now devoted to it would yield at least a third more produce, and that it would very rarely happen that the crop would fall far below an average.

From the Cork (Ireland) Advertiser, October 9.

POTATOES.

A curious fact has been stated to us by a person in the neighborhood of Carriagline. It is, that having planted potatoes in alternate beds of sea-weed and farm manure, the potatoes in the latter are entirely destroyed by the prevalent disease, while those planted in the beds covered with sea-weed have escaped untouched. The proportion which the infected bear to the healthy roots varies. In some places the destruction seems almost complete, and the progress of the disease is so rapid that in many others it threatens to become so. Even after brought home and housed, the potatoes are attacked. Several people who purchased in the market last week, and found them excellent for a few days, have since been obliged to throw the remainder out, so that it is impossible, from present appearances, even to guess at the quantity which may ultimately be secured for an acre or a field.

From the New England Farmer.

THE DISEASE OF THE POTATO CROP.

From a paper recently read before the Highland Agricultural Society of Scotland, we extract the following, without, however, adopting the author's theory of the cause of the disease:

"The first symptom of the degeneracy of the potato plant in Scotland appeared about the year 1780, when the distemper called the *curl* first appeared in the crop; but it occurred so rarely that very little notice was taken of it; but the evil gradually and extensively increased; and, about the years 1784–85, the whole crops of the Lothians were seriously affected by it. A remedy, however, was accidentally discovered, by changing the seed for that from the high country; and this has been the only remedy for the curl, up to the present time. From 1835 to the present year (1845) the seed has had to be changed yearly, as it was found a new disease appeared in the fields. This was called the *wet* and *dry rot;* and, in many instances, seed from all situations, high and low, has now failed. These two kinds of disease are variously accounted for. Some ascribe the cause to maggots and flies feeding upon and destroying the seed plants; but this is a consequence, and not a cause, for maggots and flies are only to be found on diseased or putrid vegetation. Plant a sound potato in a good soil, and, properly treated, it will find its way to the surface, and produce a good crop in defiance of all maggots and flies. The seeds of disease, then, must be in the constitution of the plant.

"In examining a diseased potato, it is plain that there is canker on the skin and plague spots all over it. This, if planted, will certainly be attacked by maggots and flies; but the plant is in a state of decay or putrefaction, and hence it belongs to them by right of inheritance. The great object, then, is to plant sound seed. As the crops on the highlands are early checked by frost, and the tops or haulm soon destroyed, they do not fully ripen; and this circumstance has induced farmers in the low districts to take up their crops for seed in a green or unripe state, in order to imitate the operations of nature on the hill grounds. But this plan has also failed. Seed has often been raised from the ball, but in two or three years it curls and degenerates.

"In looking at the origin, general history, cultivation, and general management of the potato plant in this country, I have been led to the conclusion that there can be only one cause for the failure of the plant, viz: *over-cultivation.* The crop too often repeated on the same soil, and too much stimulus applied to the plant, has weakened or destroyed its vital energies, and rendered it incapable of reproduction. In the cultivation and general management of the plant, we have entirely lost sight of nature, which always follows the moderate or middle course; and, by a long train of mismanagement, we have nearly lost this most valuable root. Who can contemplate a luxuriant crop of growing potatoes in full bloom, but must reflect on the immense stimulus applied to produce such a mass of stem, foliage, and blossom, and, at the same time, how much the roots or tubers must be enfeebled and exhausted in producing it?" * * "I would advise the experiment of topping or cutting the potato tops with a sickle about the time of the decay of the blossoms, in case the tops are too luxuriant. This will not only prevent their seeding, but check the luxuriance of the stems, and save the tubers from exhaustion. It is well known that turnip-rot is produced by excessive manuring; and I have long entertained the idea that smut in wheat, barley, and oats has always arisen from over cultivation. Every farmer has gone upon the principle that too much stimulus could not be applied to his crops; but the degeneracy of the seed or root has not been thought of."

We observe that in this country neither the rot in potatoes nor the smut in grain can be attributed to excessive manuring—that's sure.

From the London Gardeners' Chronicle, Nov. 15.

THE POTATO CROP.

I have sent you three potatoes which are evidently nearly decayed by the prevailing disease, to show that it has in no way injured their vitality; they are self sown—at least were left in the ground when the crop was taken up last August and September, when I perceived them affected, but not ripe. I let them lie on the ground, exposed for a few days, and then pitted them quite dry, in the usual way, picking out all that appeared affected, examining them occasionally. Last week I thought it advisable to throw all out of the pit, and have now laid them out in heaps in a dry loft, well covered with straw. Out of about eighty bushels about two bushels are bad, no doubt; but if they had remained in the pit, most of them would have been lost. Those decaying I found mostly breaking from the eye, and some producing, as would appear, a young potato, as you will see by one sent you. Those I had planted at the same time; and on examining them this morning, I find that they remain the same as when put into the ground, with no appearance of disease spreading. I have this week been planting about three-fourths of an acre. I in general dig the ground, and plant in each row as I go on. After planting the sets, I cover them with coal ashes: this answers two purposes—it keeps them dry, and also prevents slugs and wire-worm from injuring them. I have potted some similar to the sample sent you, and have placed them in a cool house. It will, then, be seen before the planting season whether a diseased potato will affect the succeeding crops—a thing well worth ascertaining. I should say, instead of destroying the most injured tubers, if a seed bed is thrown out, and the potatoes planted so as not to touch each other, all those that had grown would be fit next spring to be planted out in the usual way. This would be an experiment worth trying, for no doubt seed potatoes next season will be expensive to buy, if it be possible to get them at all.

T. MALLESEN.

CLAREMONT.

—

I have just thoroughly examined seven lots of potatoes of different varieties, which were stored away for seed on the 12th of September last, in charred earth, old tan, and saw-dust, charred together, and I am happy to say that the result is most satisfactory; not one tuber is to be found the least affected by the disease; and the putrid spots are so entirely dried up, that when rubbed they crumble or fall out; the other portion of the tuber is quite sound and of good quality. A neighbor of mine purchased a load of dry turf ashes, among which he stored about 25 cwt. of potatoes about a month ago, almost every potato at the time of storing being more or less affected with the disease; this day he turned them over, and brought me a sample, which is sound and dry, and the disease is entirely stayed—not one decayed tuber is to be found amongst them; when cooked, they are mealy and well tasted. Of a lot that I spread thinly on a dry floor for seed, I have been obliged to throw away above two-thirds, and the remaining portion is good for nothing: those were apparently sound when they were stored, and had been exposed for some time on a dry pavement to harden. The fungus which attacks the affected tubers runs over them very quickly—indeed, like wildfire. Charred refuse, or well burnt dry earth, or turf, or peat ashes, will at once stop the progress of the disease. I have long been

satisfied that any of these will prevent the progress of fungi; they even prevent mushroom spawn from speading. I this season planted a piece of ground which had never been manured nor cropped previously to my knowledge, with different kinds of potatoes, with a view to prove, if possible, which was the best and most valuable manure among several kinds, which I applied by weight, &c., and the result is very interesting. While the tubers produced from one particular compost were fine in quality, and not in the least diseased, others of the same variety, but manured with different material, were affected to a serious extent, though they were all growing on one piece of ground. A quantity of these tubers, free from disease, were stored in the usual way, viz: covered with straw and earth. I opened the pit and looked over them, and they are still perfectly sound.

JAMES BARNES.

Bicton.

—

I premise that my opinion—which, however, I state with some diffidence—is, that the proximate cause of the malady is the superabundance of juice or moisture in the tuber, in consequence of the excessive wet of the season, causing an accumulation of watery sap, and the concurrent frigidity of the weather, which preventing the due development of the stem and leaves, and causing their premature decay, did not afford an abundance of healthy foliage for exhaling that superfluous moisture. My potatoes were grown on very flat clay land, which, though recently thorough-drained, had not yet been sub-soiled so as to permit the free descent of the rain water to the drains; and the weather was very wet at the time of lifting, which was unduly accelerated by the prevailing panic from the supposed destructive progress of the "disease." In these circumstances, I had the potatoes carted to a lea field, intended to be broken up next year, for the convenience of a clean surface to spread them on, and obtaining sod for temporary covering. There they were laid in long narrow heaps, the different kinds separately, and covered with straw slightly "drawn" and put on thatchwise, the weather still continuing damp. This covering resisted both rain and moderate frost. On examination, a day or two afterwards, the windward side of the heaps appeared well dried, but the other side sweating and beginning to mould—the interior still more so; they were then uncovered on a dry day, spread out on the grass on either side, and put up again at night as before.

On a second examination, they were found still tending in a small degree to sweat. The same process of spreading out was repeated, after the tendency to sweat disappeared, and the progress of the "disease" to all appearance arrested. The same was the case with some of the worst of the affected potatoes, which were spread on a barn floor and turned till dry. We have been unable to find, on repeated examination, that the disease in the roots so treated has made any further progress.

Among the variety of opinions that have been given as to the constitutional deterioration of this valuable root, which seems to have rendered it more easily affected by atmospherical observations, my idea is that it has been gradually brought into what the medicos call a plethoric state, by too much forcing with manure in high conditioned land. In former times the potatoes were taken from the field and stored in cellars and other places in vast mounds, reaching from the floor to the ceiling, without injury; and the winter work was to cut the seed potatoes months beforehand, which at the time of planting were dry and shrivelled like corks. If this opin-

ion be just, the remedy would be to plough the manure (in very moderate quantity) into the ground before winter, and even to attempt to raise without manure, in fine dry soil, a small, compact, hard tuber, as a means of renovating its constitutional vigor. I mean to try both these plans myself.

In conclusion, I may mention the practice of Mr. McBride, a farmer in this quarter, who says he has followed it for many years, and has never yet had the smallest failure in his crop. He spreads the manure on the surface of his stubble land and ploughs the land, planting the potatoes in every third furrow, and drawing in with the hoe a little of the manure above the sets. I think that the potato suffers in the culture by the fibres being injured by overmuch working in the drills while in a growing state.

J. STEWART.

HEPBURN.

From the Gardeners' Chronicle and Agricultural Gazette, Nov. 22, 1845.

POTATO DISEASE.

The mere fact of dryness and coldness being recommended for the preservation of the potato, would render it more than probable that heat and moisture had in the first instance caused the disease.

That such conditions were in existence in the soil cannot be doubted; and as there can be no question about moving sap being only living sap, it really would seem that the stem of the potato was dead to all intents and purposes; so far at least as the tuber's connexion with it was concerned. The hygrometrical condition of the tuber, with the heat and moisture that were shut up about it in the soil, appears to have made it what it unfortunately is.

JOHN CAIE.

CAUSE OF POTATO MURRAIN.

That this disease is occasioned by a fungus in the leaf I have no doubt, and such, I believe, is the public opinion in general. I am equally well assured that the gangrene, or mortification, is a mere consequence of the fungus.

If, then, a certain predisposition in the potato plant, occasioned by an advanced state of the elements themselves, were alone necessary to give unbounded scope to this fungus, how, I would ask, has it happened that this strange condition of atmosphere has never occurred before since the introduction of the potato from South America—now, I believe, nearly 200 years? or shall it be said that the disease is indeed new to Europe?

On looking over the weather registries for the month of August, I find that the southwest, west, and northwest winds prevailed the whole of the month, and even extended into September; and this is, I should conceive, an extraordinary direction with regard to their continuity. Now, supposing the fungus in question to be of American origin, and new to Europe in general, is it too much to suppose that, by the continuous action of the Atlantic gales, the sporules of the fungus may have been precipitated by showers condensed from American mists? Whatever the cause be, it is to me tolerably plain that, from the breadth and uniformity of its character,

as well as the simultaneousness of its operations, it must be attributed to a cause as general as either wind, or rain, or electricity itself. Everybody has seen, according to the old phrase, "motes dancing in the sunbeams." Now, as to the sporules of various fungi, why may it not be possible for them to possess so little specific gravity as to be lighter than their own volume of air; to ascend thereby, in common with mists; to be incorporated with the clouds; to traverse thousands of miles in a few days; and to descend as propagandists wherever the winds choose to carry them, or condensation may take place?

In conclusion, I beg to say that I would not attempt to repudiate the idea of predisposition altogether, but merely direct the attention of the public to facts probably equally important.

R. ERRINGTON.

OULTON.

The tubers from which the plants have been raised this year were ripened last year in a season of almost unparalleled drought; and it appears to me that, to a certain extent, those tubers must have been assimilated (if I may use the expression) with a state of soil and atmosphere belonging almost io a tropical climate. This year the plants raised from them have had to contend with a season exactly the reverse. We know that, under particular circumstances, seed will entirely alter the nature of the plant, as regards its hardihood and time of ripening, according to the circumstances in which it is grown. Winter wheat, by being sown a few years in succession in the spring, becomes a spring wheat. Barley, on the contrary, by being sown before winter, is enabled to stand weather the most severe; the same with beans.

May not the same result have taken place with the potato tubers of last year's ripening? Would they not, in all probability, have succeeded in a hot summer better, perhaps, than those planted last summer? whereas, having had to bear all the vicissitudes of a wet summer, they have constitutionally failed.

A SUBSCRIBER.

From the Gardeners' Chronicle and Agricultural Gazette, Nov. 29, 1845.

THE POTATO DISEASE.

Salt seems to have an injurious effect, and to accelerate the growth of the fungus, or at least the decomposition of the tubers. I immersed some in a solution of salt and chloride of lime, and found them grow worse most rapidly.

The tendency of the bad potatoes to sprout is very remarkable. I have seen them lying on the ground with shoots four or five inches long, and with a healthy thickness which would make them very valuable in the spring season. In every way it is evident that the root has not degenerated, for some of the sort which the late Mr. Knight raised from the seed were as much affected as the oldest sorts. I have found a sprinkling of quick lime arrest the growth of the fungus, except where the decomposition of its substance has penetrated deep into the interior of the tuber. Immersion in

water acidulated with sulphuric acid produced the same effect, and preserves in a remarkable way the white color of the cut surface of the potato; but, with this treatment, it does not boil well for the table.

L. VERNON.

HARCOURT.

POTATO DISEASE IN CENTRAL AMERICA.

At the Academy of Sciences of Paris, November 17, 1845, Monsieur Boussingault communicated an extract from a letter from M. Joachim Acosta, of Bogota, relative to the potato disease. It appears from this letter that the malady is very common on the table-land of Bogota—that it is destructive in wet seasons, or even every year, in damp spots. This does not prevent the tubers being used, when the affected part has been removed. It is known that potatoes are indigenous to this plain. M. Acosta does not doubt that the malady has always been known there, since it excites no alarm in the Indians, who live principally on potatoes. M. Boussingault properly remarks that, in these countries, where cultivation continues without intermission during the year, and where the tubers are consumed without the necessity of storing them, there is no fear, as with us, of a bad harvest, because it may be immediately replaced by a good one.

With us, where the culture is annual, and must be preserved through winter, it is natural that we should be more concerned in a malady which may destroy the resources of a whole year.

M. J. B.

From the Gardeners' Chronicle and Agricultural Gazette of December 13, 1845.

GREENING POTATOES.

I wish I could confirm a correspondent's experience relative to the beneficial effects of greening potatoes; but here the green ones have not kept so well as those not exposed. With me it has been a practice, for some years past, to lay such potatoes as were not fit for table out to green daily as they are dug; and this year, at the time the disease made its appearance, I had several bushels so exposed, and perfectly green. Some of these potatoes had been exposed two months, being the refuse of the frame-forced ones, and had been severed from their parent stem long before the disease was heard of; so that those who assert that it commenced in the stem or haulm will see that it seized those which were stemless at the same time. The malady first made its appearance here on some ash-leaved kidneys, planted upon the "lazy-bed" fashion; the beds, however, being filled with the refuse of the garden and pleasure ground, with sufficient hot dung to excite fermentation. This rubbish was put in in sufficient quantity to raise the beds considerably above the level of the surrounding soil; so that it was perfectly porous and dry, and the potatoes were of the finest quality imaginable. Shortly afterwards it manifested itself on two other pieces of the same kind—one a piece well drained and trenched the autumn before planting; and the other a piece of ground newly taken in, well drained, and deeply dug, but not trenched.

On the latter piece of ground every potato was rotten, and the other (about one-half) was lost; so that, although they suffered the most in untrenched ground, where the water could not pass rapidly away, perfect drainage did not stop the disease.

All these potatoes were dug on the same day, and laid out to dry and green; and though they were exposed for two months, and perfectly greened, the disease is still spreading in them. At the time these were dug, (the end of July,) a peck or so was found among them that had made young shoots, and were perfectly sound. These I immediately planted with some of Chapman's kidney, for winter use; and though the latter produced a tolerable crop of sound tubers, very few of the ash-leaved made their appearance above ground. I examined the sets to-day, and find most of them sound, and intend, as an experiment, to take them up, and replant them deeper, to see if they will produce a crop in the spring.

WM. P. AYRES.

From the Gardeners' Chronicle and Agricultural Gazette of December 6, 1845.

I am sorry to add, that I saw a self-set potato the other day, from an early kind, about three inches high, or, in fact, as early potatoes are generally in the middle of May, which had the mildew fungus precisely similar to those of September last; the leaf had the same black rings or spots, and decay had already commenced: this augurs badly for those of the spring planting. As to those planted in spring, I am much afraid that precautions will be vain, as I have no doubt the very hedges are full of the sporules of this sad mildew. The oak and the black thorn, and the common nettle, were prematurely destroyed around the potato fields in this neighborhood, at the period when the mildew was at its height; they also decayed in black patches in the leaf, as the potatoes, but whether the same, or a fungus at all, I cannot say; things looked very suspicious. The oak and the nettle were generally affected.

R. ERRINGTON.

OULTON PARK.

[We trust there is no real cause of alarm on this head. Experiments, conducted for the purpose of ascertaining whether the disease will appear in any other crops, seem, at present, to show that there is nothing to apprehend. There can, however, be no doubt that every possible means should be taken to secure a healthy growth next year.]

From the Gardeners' Chronicle and Agricultural Gazette of December 20, 1845.

REMARKS OF THE EDITOR.

These were the just views of *Mr. Garden*, of Glenae, to which we alluded last week: "We may, for a time," says this gentleman, "raise species of *diseased* plants, and employ these as seed (sets) of the next crop. Nothing can be more manifest than that the offspring of diseased parents will participate in the disease, and even be incapable of cure, or of becoming the seed of a healthful crop on any soil. * * It is evident that dis-

eased plants may be more easily cultivated on a healthful and fresh soil than on one which is diseased and run out. * * * But the *abundance* and *healthfulness* of the crop are two very different things. It is well ascertained that seed potatoes (sets) taken from the fields on the higher grounds, and where potatoes have been much seldomer cultivated, are less liable to fail than those raised on fields which have produced *many* potato crops. * * The latter, *forced* in diseased or exhausted fields, are unfit for seed (sets) in any situation."

A potato, forced in rich land, nursed in a warm valley, and unnaturally expanded into a monster of its kind by high and debilitating manure, becomes well suited to the table, but has an uncompacted tissue and a feeble constitution. A small matter makes it ill. Its unhealthiness is communicated to its successors, and so the evil is ceaselessly augmented. On the other hand, a potato raised in poor or rocky ground, small and compact, thoroughly organized by the action of healthy foliage operating upon a small surface, will not answer, indeed, the purpose of the grower of a crop, but is admirably adapted for his sets. It is not in itself marketable, but it forms the best of seed. Thus it was that the small green stem-potatoes, which high cultivation has almost driven out of recollection, always proved the best of all for sets, though utterly uneatable and useless for the table.

What we then would advise growers to do, is, not to indulge in a vain hope that seedling potatoes will be any better than what they now have; but to adopt the practice of raising potatoes for sets upon a different principle from those which are for the table; to treat the latter as they now do, but to grow the former in poor, light land, where there shall be no excessively rapid growth, and no great produce, but where a small, compact potato, thoroughly ripened, thoroughly organized, and therefore thoroughly healthy, will be a guarantee that all the freedom from disease, which, in the nature of things, is to be expected, shall be secured for the crop it is to furnish, beyond all chance of risk.

If such potatoes are left in the ground all the winter undug, or are planted in the autumn, or, if taken up, are thoroughly greened and packed in sand, and planted before sprouting, a far more rational means of renovating the potato crop will be adopted than running to Peru for seed not half so good as our own.

—

POTATO MURRAIN.

It is the belief of some that a fungus is the cause of this disease. From facts, however, which have come under my own cognizance, I am led to hold a contrary opinion. I have about three or four bushels of last year's potatoes (they have been about twelve months out of the ground) that have been since spring in a corner of a tool house, held up in front by a few loose bricks; and, as might be expected, they have put forth numbers of small tubers, and the greater part of these small tubers are diseased, and bad as any that have been grown in the soil in the open air. I should suppose that the manner in which the fungus is conceived to affect them, is by a transition from the leaf to the tuber; however, in my case, it will be perceived that such is not the case, as not a single leaf has been formed. The small tubers have been produced from the intercellular tissue, or elaborated

matter of the old potato, and without the assistance of any foliage whatsoever; but, as the tool-house door stands open all day, and the potatoes are not far from it, they are consequently under atmospheric influence, and the greater portion of them are covered with fungus, which seems to have proceeded from the top to the bottom of the heap. I have, likewise, some early potatoes that are diseased to the very centre, without a fungus having yet made its appearance upon them. These two facts surely prove that the fungus is not the primary cause of the disease, which certainly does not occur through the agency of the leaf. I have always been of the opinion that it is to the dull weather we have experienced that we must attribute the cause. The plants have been charged to excess with water, which, owing to the absence of sunlight, could not pass off by evaporation; this, then, has produced a disorganization of the tissues, and disease has followed in consequence.

I observe an article in last week's number setting forth the average quantity of rain that has fallen during the last eight years, as a proof that the disease is not caused by moisture. It is not the great quantity of rain that has fallen that is to be considered the cause, for we certainly have had more in other years, but the absence of bright sunlight must be kept in view; for days the sun never broke forth to dispel the moisture of the atmosphere, or to elaborate the juices of the plant. I cannot conceive any other cause for the small tubers grown in the tool-house being diseased, unless it is to be ascribed to some unknown atmospheric condition. This fact sets at rest the opinion as to manure of any kind being the cause, none whatever being present. Lime cannot be considered an antidote to the growth of fungus; for a great quantity of diseased potatoes here has been well dosed some time ago with caustic lime, and on many of them the fungus is abundant; not even drying and greening by exposure will entirely prevent its growth, as I myself have proved, although it does partially. Mr. Ayres remarks that he cannot add his testimony to the beneficial effects of greening. If the potatoes are diseased previously to greening, the disease will proceed, although much more slowly; and such, I have no doubt, was Mr. Ayres's case. Such is the case with some of mine; but greening potatoes for seed, if perfectly sound, I believe does produce beneficial effects. That the potatoes have received the disease during their growth, I feel firmly convinced; otherwise they would not receive it after, for I have some ash-leaved kidneys green, and ripened early on a raised slope in the garden, and greened by a long exposure, and they are now as promising seed as I could wish, and I have no fear that they would have remained sound if not greened. The question for seed another year appears to me a serious one. I am afraid planting potatoes diseased at all, either now or in the spring, will prove a fruitless effort, as I doubt not they will rot when they come in contact with the moisture of the soil.

HENRY WOOD.

From the Manchester Guardian.

THE POTATO DISEASE.

At a meeting of the Manchester Literary and Philosophical Society, Mr. A. Campbell, curator of the botanic gardens, stated that he had tested the

efficacy of fumigating with sulphur, suggested by Mr. Thorn, and had found that in those potatoes which had been subjected to the process the disease never made any further progress, even though they were subsequently placed in contact with diseased tubers. He also referred to other experiments, most of which went to prove the necessity of exposing the potatoes to light and air, and the evil effects of hogging or pitting them. Mr. Dale said he had planted a potato which had been fumigated, and found it to vegetate as well as those to which sulphur had not been applied. The whole of the observations that were made confirmed the accounts previously given, and light and air, a good ventilation, and a frequent examining and turning of the potatoes, are the most effective agents in checking the disease.

From the Mark Lane Express, December 1, 1845.

POTATO DISEASE.

From the Leicestershire Agricultural Report.

So much has been said and written upon this matter, by the learned and the unlearned, it would be presumptuous in us to make any lengthened remark as to what means should be taken to arrest the malady; but, as it is generally admitted that it proceeds from an excess of water in the tuber, we believe the best way to preserve them is to cut every potato in two, or if small, a considerable piece off them, which gives vent to the watery matter; and if they are stored in chaff, slacked lime, or anything of a drying nature, they are likely to escape the decay which otherwise awaits them. Even the saving of some for seed becomes a matter of great importance. There is no fear as to the diseased tubers growing, as a friend of ours stated he had seen sets with shoots more than an inch long from diseased potatoes, which lay in a warm place. We believe that, in this country, not one sixth the usual quantity will be preserved until the spring.

From the Berkshire Agricultural Report.

We know not whether the distemper, that certainly has prevailed with more or less violence, is likely to be reproduced by the tubers hereafter to be planted; but it cannot be doubted that the tainted ones are wonderfully excitable. The eyes, if they do not push shoots, are inclined to produce a perfect young tuber; and therefore a full experiment ought to be tried at once, by sowing extensively such potatoes as are sound within, though affected superficially—taking care to cover each row with atl east twelve inches of good earth. Another method of planting migot oe, o make drills, six inches deep and two feet asunder, covering first with earth, and then with as much coal ashes. These could be raked off in spring, and scattered over grass or clover land, to which latter they are applicable,, specially when they contain gypsum, of which we have detected, occasionally, nearly ten per cent. Another fact is worthy of mention. Though no one can doubt the attack of the haulm as the early indicator of disease, in

the *first period* of its attack, about August, yet the condition of the leaf in October and November was no certain index. Two plots of potatoes, standing side by side in one field, each about forty yards long, ten yards wide, exhibited appearances totally different. One, the Jersey blues, had no sign of vegetable life remaining early in October; its neighbor, a white variety, was verdant as spring. Suddenly, the latter became affected at the close of October, and both were dug up about the 10th November instant.

The *blues*—those which were black six weeks before the others gave any sign of disease—*were nearly all sound.* Of the whites, 150 bushels were raised, and only 18 remained fit for pigs!

From the Mark Lane Express, December 1, 1845.

POTATO DISEASE.

To the Editor of the Salisbury and Winchester Journal:

Sir: It is now some years since, after a severe winter, and the snow lying long on the potato pits, I found, on opening them, a very considerable portion apparently completely destroyed by the frost. My bailiff was about taking them to the dung-heap; but, with no trifling difficulty, I induced him to fill our steaming tubs, and, to my delight and astonishment, we found, after the operation, their contents as fair, and the meal as fine, as from the potatoes that were perfect.

It is now about three years since that I discovered a pit containing about a hundred sacks of potatoes, showing a sinking upon the surface, which induced me to suspect mischief. I directed them to be opened; and the effluvium arising from them was frightful. We found nine-tenths of them more or less affected. I would not, however, throw them away without trying the effect of steam; when again, to my surprise, the offensive matter was removed, and the remainder was perfect and fit for use. I scarce need say that I am pursuing the same operation with the diseased potatoes of the present year, and have great pleasure in stating, with the most perfect success. I have grown between seven and eight hundred sacks, of which I consider nearly one fourth to be more or less affected; but all fit for the steamer.

When thoroughly steamed, and not required for immediate use, it would be desirable to place them in a tub or vat, (but sunk in the ground to keep them air tight,) and thoroughly beaten with wooden rammers. A little salt sprinkled over them during this latter operation will keep them sweet and fit for use for many months to come.

J. PENISTON.

RENOVATION OF THE POTATO BY SEED.

Having three times, during a long life, raised potatoes from the seed, and minutely observed the progress of vegetation from the period of sowing to

the maturity of the crop, and having given my best attention to the culture in every stage, my practical experience and observations convince me that the time has now arrived which makes it imperative to renovate the *potato by seed.* The first step in this experiment is to collect the balls, or seed berries, or potato apples, as they are called, and place them in a dry situation; but these would have been found with greater facility before the late crop was raised; yet there are a sufficient number to be found scattered about the land where they grew, on every farm. The apples, having been hoarded till as mellow as ripe plums, must be squeezed by hand in a basin of water, till the tough skin and pulp are well separated from the seed, the latter of which will readily quit the former, and precipitate to the bottom of the basin; the water must be poured off and the seed spread thinly on a coarse cloth to drain and absorb the remainder of the water; and then removed and spread upon brown paper, and, when perfectly dry, must be well preserved till the following spring, for sowing.

I have found the most favorable time for depositing the seed in the ground, well pulverized, is the second week in May, or thereabouts; at this late period the probable occurrence of frosty nights may be less prevalent than at an earlier sowing, as the tender plants springing up are extremely susceptible of the least frost. The operation of sowing may be performed precisely the same as with onion seed, and there will be no particular care to be further taken before the time of transplantation.

The seed will come up freely, and the plants, when elongated three or four inches, should be carefully raised with as much root as possible adhering, and removed into small trenches ready to receive them, and planted to the depth of the under leaves, distant about six inches apart in the trench, the trenches being about fifteen asunder; and the earthing up may be performed in the usual way as the plants progress; but the transplanting operation will be more favorably done should the earth then possess natural moisture. As the plants advance towards maturity, some will exhibit great luxuriance a long time, and others will sooner appear to droop; the latter indicate an earlier sort, and may be distinguished by placing a little stick at the haulm. The process now terminates; but the fruits of the labor in raising the ripe crop will present a scene to the operator truly wonderful and amusing; he will behold amongst the vast variety of new potatoes, at the roots, from the size of a pea to that of a pullet's egg, purples, whites, flats, rounds, kidneys, &c.—in fact, such demonstrations of the sports, freaks, and vagaries of nature, as are truly astonishing. These new roots must be planted whole the following season; and after, they will be in perfection for selection as future stock.

SENEX.

GLOUCESTER, *November* 19.

From the Mark Lane Express, Dec. 8, 1845.

To the Editor of the Dublin Evening Post:

DEAR SIR: The disease of the potato, I believe, arises from an excess of moisture in the tuber. It is not surprising that potatoes surcharged with moisture should heat and decay when deposited in close pits. Grain put prematurely together would likewise decay. With respect to diseased

potatoes, I have to observe, that I cut some of them with a view to ascertain whether the disease would go forward in the sound when removed from the diseased part. More than three weeks have elapsed, and the disease has not made further progress in the diseased portion, whilst the sound continues sound. The superfluous moisture appears to have escaped by the incision, and the disease to have been arrested in its progress. It appears to me that the redundant fluids of the potato press towards the outer rim, and not finding a vent, the disease commences like a bruise, round the rim, or in the weakest part of the potato. Cut the potato across, and, as far as I have observed, the disease is arrested, when the operation is timely performed.

I dwell on this, because I fear a considerable portion of the crop will, from time to time, become diseased, and because I conceive the cutting of the potato will save the greatest part, at least for present use, as human food ; and I think it, moreover, probable, that in many instances it will be found expedient, as a measure of precaution, to cut a portion from the sound potatoes for seed or other purposes, and thus relieve them from their superfluous moisture.

With respect to a future crop, I would strongly recommend that all small potatoes should be reserved for seed. It has been generally remarked they are this year the soundest; and this, probably, arises from there not being such a body of superfluous fluid in them as in the large. I have proved, by experiments, the great value of small potatoes planted entire. They should be closer set than the large ones; and, if properly attended to, a full crop may be expected.

I perceive by the public papers that a learned German professor, and others, expect relief next year from the seed of the apple, to be sown in the spring. It is certainly most desirable that the raising new kinds from seed should be generally adopted; but, as far as my experience goes, it is some years before new kinds are fit for human food, and the proportion of those which prove eventually good is very small. In consequence of the partial failure of the potato crop in 1831, I sowed the seed of the white apple and pink-eyed species in 1832, in the same manner as celery. The young plants are very delicate. They should be transplanted when sufficiently strong, in drills. A perch of ground produced 102 pounds, and exhibited a great variety of kinds. Each kind had its trial for one or more years; and such as were considered incapable of improvement were rejected. Ultimately, two kinds only were considered worthy of cultivation ; and I send you specimens of one of them, which I call the Palmerston apple-cap, from having been cultivated there. You will perceive that it is an excellent potato. I have more than 30 tons of this kind—most valuable for seed. The disease in this species was by no means so bad, nor to one-tenth of the extent that pervaded apple potatoes of the old kind, which adjoined them in the field. Their constitution being more vigorous, resisted the disease ; but there was disease amongst them, and the same superabundance of moisture that may generally be perceived in potatoes this year.

Yours, faithfully,

LELAND CROSSTHWAIT.

From the same.

Dear Sir: An industrious person, for whom I entertain a regard, and whose crop of potatoes consisted of about three tons, of excellent quality, obtained leave to place them on a spacious air-drying loft, which afforded an opportunity of spreading them thin. After the lapse of a few days they lost their bright color, and were discovered to be so seriously affected, particularly the largest and finest, that they were of little value. I prevented him from throwing away a quantity of them. They have since been cut across, and the progress of further decay has been arrested; and the color, in a great measure, restored. Those which were accidentally cut with the spade almost entirely escaped; and also the small ones, with little exception. They will all be reserved, and will, I doubt not, make excellent seed.

As to the large potatoes, the keen air to which they were exposed checked evaporation, contracted the outer coat, thereby causing a pressure on the potatoes in a state of plethora, as they mostly are this year, and producing the bruised appearance, which has been considered a particular disease of so insidious a character as to render potatoes so affected unfit even for pigs.

I find, in an article from Lower Saxony, November 6, that amongst the methods adopted to stay the malady, which had accelerated and increased its ravages, was that of large cultivators having exposed the dug-out bulbs to a current of air.

It thus appears that the same cause in places so far asunder has produced the same effect, and it may probably be inferred that the disease is the same. It has been by many considered that the disease proceeded from the leaves and stem to the root; but some potatoes are affected at the butt, whilst the crown is quite sound. Others suppose that the disease proceeds from fungus; but, as far as I have observed, when this does appear, it is not until a potato has reached an extreme state of decay, and it seems to be the consequence rather than the cause of the disease; besides, fungi are occasionally discovered every year in decayed potatoes.

Greatly alarmed a month back, I intended that all the stalks should be burnt, in order to prevent the supposed infection from spreading; but close observation has altogether changed my opinion, and they have been added to the dung-hill. It has also been said that late potatoes were the most subject to the infection; but nearly one-half of the old apple-potatoes, to which I referred in a former letter, and which were planted in March, were diseased; while, in three-fourths of an acre of "Palmerston apple-cap potatoes," planted 3d July, after a crop of rye used for green feeding, only $\frac{1}{75}$th part has hitherto proved to be affected; but, on the other hand, potatoes planted before the severe frost of last winter escaped entirely. I mention the latter circumstance, lest an opinion might otherwise be considered as having been given in favor of late planting, which ought to be avoided, except under particular circumstances.

In order to ascertain whether the disease could communicate any injury by being put in contact with the sound part of a potato, I cut diseased potatoes across, which were sound in the centre, made excavations in them, put pieces of highly injured potatoes to fit therein, and then tied the cut pieces closely together. On opening them after some days, I found that the disease had not been communicated to the sound parts, but that the diseased parts had materially improved. My friend Sir James Murrey, who had read my letters to you, informed me on Friday last, that, amongst other experiments,

he cut off the sound part of a potato from the diseased, and applied a preparation of lime to it. The result was, that the application deteriorated the sound part, whilst the mere incision, without any application, improved the diseased part.

LELAND CROSSTHWAIT.

From the Mark Lane Express and Agricultural Journal, of Dec. 15, 1845.

MAJOR BEAMISH'S EXPERIMENT.

We are authorized to state that the simple method of rendering diseased potatoes available for human food by boiling them in two waters, (the first being thrown away when it has reached the boiling point,) has been tried by Major Beamish with complete success. He purchased, we are informed, last week, 100 weights of so called diseased potatoes, at the current depreciated rate of twopence per weight, for the purpose of giving them to cattle, (conceiving, with the seller, that they were fitted for no other purpose,) and had already applied many of them to that use; but after seeing a statement in the public prints, he had a portion taken indiscriminately from the heap and boiled according to the prescribed directions. The result was in every respect corroborative of the first experiment. The whole of the black acrid matter, which in few cases extended beyond the skin, was completely extracted by the first water, and the potatoes, when served up to table, after the second boiling, presented as sound an'appearance and were as dry and palatable as any potatoes of the kind, under the most favorable circumstances. They were the common white lumper or horse potato, and were cooked "in their jackets."

From the Mark Lane Express and Agricultural Journal, of Dec. 22, 1845.

THE POTATO DISEASE.

The assertion of a fact seems to me to offer a clue to this great enigma, which has afforded so much excitement. It is the presence of sulphureted hydrogen in rain water in and during the latter end of summer. This I observed, and proved by chemical means; indeed, the water was so much impregnated with it that the presence of lead turned it to a deep brown. This fact, I find, does not only rest upon my own observation, but acute observers, who have no pretension to science whatever, have noticed this peculiar state of rain water at times, and even at miles distant. Now this cannot be a mere local case, for there is no local cause. It must be more universal than in the immediate neighborhood, as there is nothing to afford the slightest cause for its being generated; and though it is sometimes given out in vegetable decay, as in pools, &c., yet it made its appearance at a time when Britain's verdure was at its height.

Thus, there does not appear any probable cause for so remarkable a phenomenon in England; so, consequently, we must look for a cause beyond the sea. The remarkable exhalations of some of the European volcanoes, which have been reported, seem to afford a probable cause for its existence,—as the property of this gas on mixing with water is well known.

Now, having seen that such did exist in rain-water, and that, in all probability, it originated with some volcanic eruption, let us see the likelihood of its being the cause of potato decay. It is reported that it is not known in the more southern countries; this is what one might expect from such a cause, and to suggest a theory of its probable manner of acting. Its power of deoxydizing metallic oxides in solution is well known to chemists. Now, according to Sprengel's analysis, potatoes contain, of their weight, about $\frac{1}{30000}$th part of oxide of iron. The impregnated water acting upon potatoes in deoxydizing the iron, might produce, to all appearance, little effect at the moment; yet, in process of time, the iron would begin to attract oxygen again, when hydrogen would be liberated, and, by the vis-inertia, combine with the nitrogen, and produce a decay in the potato.

Such a theory appears probable, though it may not be quite correct; but at all events, I have, by artificial means, produced similar results. I took a few small round potatoes—the best I could pick—and steeped them in strong impregnated water two or three days. I then poured off the water, when they appeared no different. In the course of two or three days or so, I found some of them covered with a white mould, and all beginning to feel rather soft; and about the fourth night, all going more or less—some presenting nearly throughout a gray appearance, much after the manner of those I have examined that have gone of themselves; and, indeed, a practical farmer told me they quite resembled some of his; and I also found a considerable quantity of starch, to all appearance no worse, which I extracted out of the worst part. This experiment goes to prove the preceding views. It is also reported they all went not in the tubers, but in the stalk. Now, the water soaking into the stalk would show itself there first; but the impregnated water, in passing through the soil, would become partly decomposed, though not quite so; consequently, it seems to harmonize with the account.

It has also been stated that Mr. Rees's suggestion of chlorine has also restored them. Now chlorine, as well as its antiseptic properties, decomposes sulphureted hydrogen. Thus, all reports serve to corroborate the truth of what has been stated, and much more might be stated in its favor; but, after seeing that the presence of a gas in rain water—a produce of volcanic eruption at a time when such were pouring out most furiously, and when there was no other probable cause—it makes it almost indisputable that such was the origin of it; and having shown that this was capable of producing dire effects upon potatoes, these, together with other corroborations, place it almost without doubt, wanting nothing but a philosophic history of the disease, together with the state of the winds, to make it as clear as if Euclid had demonstrated it.

Broughton in Furness, *December* 6, 1845.

From the same.

DISEASED POTATOES.

Our attention has been called to a circumstance which may be of service to those who are employed at the potato mills, among the diseased potatoes. Two men belonging to the town, employed some weeks ago among the potatoes preparing for the new mill at Friartown, happened to get (one a thumb and the other a finger) slightly scratched; but so trifling were the

wounds that they paid no attention to them, and continued at their work two or three days after. The injuries, however, continuing to increase in severity, the limbs having become dreadfully swollen and painful, they were obliged to drop work. The swelling, accompanied with the most severe inflammation, continued to increase, extending along the hand and up the arm; and to such a state has it reached that at the present time it is doubtful whether both the workmen may not require amputation of their arms to be performed. A boy, about eight years of age, while engaged in grating diseased potatoes, about five weeks ago, to make weavers' dressing, got a finger scratched upon the grater, and is also in a state of suffering similar to that stated. This leads to the belief that there must be some highly poisonous quality in the potatoes, of which it would be well for those who work among them with broken skin to beware.

From the Gardeners' Chronicle and Agricultural Gazette, November 1, 1845.

REPORT OF IRISH COMMISSIONERS.

The commissioners in Ireland, directed to inquire into the disease which has attacked the potato crop in the United Kingdom, consist of Professors Kane, Playfair, and Lindley. Their first report, directed merely towards the prevention of improper methods of storing the crop, has been published by the Irish government, and distributed, by means of the constabulary, through the whole country. We reprint it, and shall continue to give our readers the succeeding reports as soon as they have been made public. As they will contain all that is considered worth recording respecting this fatal disease, it will be needless henceforward to occupy much space with other comments.

As we said before, the issuing of this commission is a sufficient proof of the prevalence of the potato murrain to a most formidable extent, and of the accuracy of the view we have always taken of its importance.

We by no means blame those who, disbelieving the extent of the mischief that has been done to this crop, charged us with exciting undue alarm. They had not our means of gaining information. We hope, however, that on a future occasion, when we shall again have to anticipate the ordinary intelligence of newspapers, if such an occasion should unhappily arise, those who disbelieved us in the present instance will give us credit for not making assertions without due authority.

In Ireland the official inquiry is essentially aided by the important evidence collected by various diligent inquirers, especially by the *Royal Irish Agricultural Improvement Society*, a most zealous and useful association, and the officers of the *Royal Dublin Society*. In England the Rev. M. J. Berkley and Mr. Edward Solly are occupied with a minute investigation of the subject for the *Horticultural Society*, in the mycological and chemical points of view; and in Scotland the *Agricultural Chemistry Association* have put forth a circular inviting the public to subscribe five hundred pounds! for the expense of an entomologico-botanico-chemico-practical examination of the subject.

The following is the report above alluded to:

"BOARD-ROOM, ROYAL DUBLIN SOCIETY,
"*October* 24, 1845.

"MY LORD: We, the undersigned, commissioners appointed by her Majesty's government to report to your excellency on the state of disease

in the potato crop, and on the means of its prevention, have the honor to inform your excellency that we are pursuing our inquiries with unremitting attention.

"We are fully sensible of the important and difficult nature of the inquiry, and therefore are unwilling to offer, at the present moment, any final recommendations, as we are still receiving evidence, and awaiting the results of various experiments now in progress. But at the same time, we ought to state to your excellency that we have reason to hope that the progress of the disease may be retarded by the application of simple means, which, we trust, may appear worthy of adoption, until we are enabled to offer further recommendations.

"In the present communication we avoid entering into any account of the origin or nature of the disease; but we would particularly direct attention to the ascertained facts, that moisture hastens its progress, and that it is capable of being communicated to healthy potatoes when they are in contact with such as are already tainted. A knowledge of these facts, determined as they have been by experiment, and agreeing with the scientific information obtained as to the causes and nature of the disease, leads us to propose the adoption of the following plan for diminishing the evils arising from the destructive malady:

"In the event of a continuance of dry weather, and in soils tolerably dry, we recommend that the potatoes should be allowed for the present to remain in the land; but if wet weather intervene, or if the soil be naturally wet, we consider that they should be removed from the ground without delay.

"When the potatoes are dug out of the ground, we are decidedly of opinion that they should not be pitted in the usual way, as the circumstances under which potatoes are placed in ordinary pits are precisely those which tend to hasten their decay.

"We recommend that potatoes, when dug, should be spread over the field, and not collected into heaps; and if the weather continue dry and free from frost, that they should be allowed to lie upon the field for a period of time not exceeding three days.

"The potatoes, after being thus dried and improved in their power of resisting disease, by the means proposed, should then be sorted by carefully separating those which show any tendency to decay. Those potatoes which appear to be sound should then be placed about two inches apart in a layer, and over each layer of potatoes should be placed a layer of turf-ashes, or dry turf-mould, or dry sand, or burnt clay, to the depth of a few inches. Thus will be formed a bed of potatoes, each potato being completely separated from the other by a dry, absorptive material; upon this bed another layer of potatoes should be spread in like manner, and also be covered with the dry materials employed. As many as four layers may thus be placed one above the other; and when the heap is completed, it should be covered with dry clay, straw, heath, or any other material adapted to protect it from rain.

"In the event of the weather becoming wet, these recommendations are not applicable. In that case, we would advise the potatoes to be packed in small heaps, with either straw or heath interposed, and well covered; in such a situation they should become as well dried as seems practicable under the circumstances. When out-buildings exist, it would be advisable that this mode of temporary packing should be carried on in those places. If there be no outhouses, the heaps may be left in the open field. We,

however, particularly recommend that potatoes should not be removed into inhabited rooms.

"With regard to the treatment of potatoes already attacked with the disease, we have to state that in this early stage of our investigation, we do not feel justified in proposing to your excellency any mode of positive treatment: this subject we reserve for a future report; but we may remark that exposure to light and dryness in all cases retards the progress of alterations such as the disease in question, and we therefore suggest that all such potatoes should, as far as possible, be so treated.

"We do not mean to represent that these recommendations, if carried into effect, will prevent the occurrence of disease in potatoes; but we feel assured that the decay will extend less rapidly and less extensively under these circumstances, than if the potatoes, when taken from the ground be at once pitted in the usual manner. Neither do we offer these suggestions to your excellency as a final means of securing the crop, but merely as a method of retarding the progress of an enemy whose history and habits are yet but imperfectly known, whilst we endeavor to ascertain the means of more completely counteracting its injurious effects, if any such can be discovered.

"All which we submit to your excellency's consideration, and remain, your excellency's obedient and faithful servants,

"ROBERT KANE,
"JOHN LINDLEY,
"LYON PLAYFAIR.

"To His Excellency Baron Heytesbury, &c.'

From the Gardeners' Chronicle and Agricultural Gazette, Nov. 8, 1845.

SECOND REPORT OF IRISH COMMISSIONERS.

Board-room, Royal Dublin Society,
October 29, 1845.

My Lord: Having submitted to your excellency, in a former report, some preliminary instructions intended to prevent improper treatment of the potato crop still remaining unaffected, we now have the honor to lay before your excellency our views regarding some processes of treatment for the potato, which appear to us to be of practical value and importance.

We are deeply sensible of the incompleteness of form which this mode of presenting our results to your excellency necessarily assumes, but the exigencies of the case are such, that we consider it our highest duty to bring at once under the notice of her Majesty's government such principles, or modes of practice, as, upon due consideration, we feel authorized to recommend.

We have been engaged in the investigation of many plans for preserving diseased potatoes, as proposed by other persons, or suggested by ourselves, and we have been collecting precise information as to the experience of others in their endeavors to arrest the progress of the disease. From all the results that we have obtained, we feel justified in submitting to your excellency the following observations:

Plans of treatment have been proposed by persons possessing more or less chemical knowledge, in which, by some, acids are to be employed; in others, alkaline liquors; and in a third class, gases, such as chlorine.

These processes we dismiss from further consideration, as, even did they in the laboratory answer the intended purpose, they are totally inapplicable to the circumstances of the produce of an entire county, and to a population such as that for whose welfare your excellency is so deeply anxious. Other methods, apparently more practical, consist in the treatment of the potatoes with chloride of lime (bleaching powder) and salt, either separate or in mixture.

The result of our own experiments, and the evidence we have received concerning trials made by persons in whom we have full confidence, authorize us at once to recommend the rejection of those materials. We have found the decomposition of the potato decidedly accelerated by their application. With respect to lime, the results of our own experiments are not yet decisive; nor is the experience of others as yet satisfactory. We therefore reserve this point for further consideration.

Whilst the disease is not yet very far advanced in the potato, it is certain that, after being boiled or steamed, it may be employed as food for immediate use, both for man and other animals, without prejudice to health.

When the disease is more advanced, so as to have invaded a large part of the potato, and when the tubers have acquired a disagreeable smell, their influence on the system is more questionable.

We have put in operation a series of experiments in order to determine this point, and will, in due time, report the result to your excellency. As, however, the potato, when once affected, quickly runs into total decomposition if left to itself, it is evident that its consumption merely for the purpose of food cannot be sufficiently rapid; and it therefore becomes necessary to consider to what other uses it may be applied.

The extraction of starch from potatoes, and its use as food, having strongly attracted public attention, and conflicting and in many cases inaccurate opinions having been entertained on this subject, we consider it of paramount importance at once to direct your excellency's attention to the actual state of knowledge regarding this material.

It is recognised that the potato, in relation either to its weight or bulk, is one of the most inferior articles of food. In its ordinary state of sound constitution, every hundred pounds by weight of potatoes contain, on an average, 74 pounds of water, of skin and fibrous matter 8 pounds, and of starch 16 pounds; whilst of gluten, the most nutritious of vegetable matters, and which predominates in corn, there is not more than 2 pounds in the above quantity. It is quite certain that starch, or materials corresponding to it, exist to a certain amount in every variety of useful food; but it is equally certain that in food, starch is not the material which serves for the support of the animal frame; and an animal fed on starch dies of starvation nearly if not quite so soon as if totally deprived of food. Hence starch, extracted from the potato, cannot be viewed as a substitute for the potato itself; and we consider it of great importance that while the attention of the people is directed to the real value of starch, and the uses to which it may be advantageously applied, they should not be allowed to rest their hopes of nourishment during the succeeding season upon any store of it alone.

With this preliminary caution, we have to state to your excellency that

probably the best use to which diseased potatoes may be applied is the extraction of starch. In a commercial point of view, the starch represents a considerable proportion of the value of the potato, although it is not at present in as large a quantity in the unsound tubers as in those which are free from disease. The extraction is simple, and consists in processes which we need not here describe, as they are given in the current publications of the day, and indeed are already practised in most parts of the country.

Your excellency is aware that we are directing our attention to the manner in which starch can be advantageously employed. It can be worked off, and with utility, as food, when mixed with proportions of oatmeal, bean-meal, or peasmeal; and such intermixture forms an excellent and economical article of food. It is also to be remarked that the pulp remaining after the extraction of the starch from the diseased potatoes contains a considerable quantity of nutritive material; and as the decomposing substance is, to a very great extent, washed out during the preparation, the pulp may, when dried, be applied with confidence to the nourishment of animals. Further, if the dried starch extracted from the potato be mixed up with the dry residual pulp, a material will be produced really representing the potato, equivalent to it as food, and, if kept dry, capable of being preserved for a considerable length of time. It of course must be prepared for use by cooking or baking in the ordinary way.

The manufacture of the pulp and starch on an extensive scale, in accordance with these suggestions, we venture to consider worthy of your excellency's attention. It is an operation not suited to the circumstances of isolated cotters, and just now might not be a proper object for commercial speculation.

But arrangements might possibly be made for carrying out this recommendation through the agency of the poor-laws unions, and other government establishments, in which mechanical power and intelligent superintendence could be speedily and economically applied. We feel, however, that even these facilities for the conversion of the tubers may not be sufficient to keep pace with the progressive injury which, it is to be feared, the potato crop is sustaining.

We therefore recommend a mode by which we believe the process of decomposition may be retarded. In our preliminary report we mentioned to your excellency the important influence exercised upon the disease by moisture and dryness. Our subsequent investigations have confirmed this opinion; and we believe, where means exist for a more complete drying of the tubers, such a method will prove the most efficacious plan for preserving the potato from further decay. This more perfect drying cannot, however, be effected in this climate by mere exposure to air. It requires artificial heat, applied in some form of kiln; and without entering into mechanical details, we may name some contrivances which seem well adapted to the purpose.

The corn kilns, extensively distributed through the country, may at once be applied to the drying of potatoes; which will, however, demand a temperature rendered gradually higher than that required for corn. But as in many cases those kilns are at present fully occupied, we would represent that every lime-kiln may be adapted to the purpose without interfering with its ordinary operations, by erecting over it, at a suitable height above its mouth, a framework of hurdles, upon which the potatoes may be spread in a thin layer, fresh potatoes being added as the others become dry and are

removed. In localities where the previous means do not exist, or may not be on a sufficiently extensive scale, potatoes may be spread on a framework of hurdles, supported on a few props of stone two or three feet high; one or two turf fires burning slowly under the hurdles would effect the same object. There need be no fear of the potatoes becoming slightly browned, as they are not injured thereby for future use; and the turf smoke would act favorably on the potatoes rather than otherwise. In all these modes of drying, the potatoes should be cut into two, or, if very large, three pieces, so as to allow the water to escape.

Potatoes dried in any of the modes above described are certainly capable of being preserved, when kept in a dry place and stored with the precautions described in our first report, until suitable opportunities arise for converting them into starch or meal, according to the degree in which they were affected by the disease.

It is gratifying to us to find that our own opinion as to the advantage of thoroughly drying the potato in the manner we have recommended, and by processes such as those above described, are confirmed by the experience of highly intelligent persons, who have simultaneously directed their attention to the subject.

We shall not hesitate to bring under the notice of your excellency our further conclusions; and we have the honor to be your excellency's obedient and faithful servants,

ROBT. KANE,
JOHN LINDLEY,
LYON PLAYFAIR.

To His Excellency Baron Heytesbury, *&c.*

From this it will be seen that we were right in refusing assent to the recommendations that have been offered, by various persons, of nostrums for saving the decaying crop. Even chloride of lime, positive as were the assertions of its efficacy, is condemned, and, as we now know, with perfect justice.

The first report has been made the subject of criticism by gentlemen who seem to have been disappointed at not finding effectual remedies proposed in a report whose whole objects were, as it declared, entirely temporary.

The *gist* of the commissioners' recommendations was to secure dryness, and absence of contact, by all possible means; and any intelligent man would see that the particular methods proposed were merely in reference to those all-important precautions, and might, keeping them in view, be departed from according to circumstances.

Dr. Halpin, of Cavan, has strongly urged upon the Irish potato-growers the construction of pits, in which it is supposed by him that effectual ventilation is secured by laying the potatoes on rough sticks or other materials, and introducing into the heaps cone-shaped funnels of wicker-work, the whole, except the mouths of the funnels and a hole at each end, being covered down with clay or earth. We add the reply of the commissioners to this proposition:

Board-room of Royal Dublin Society,
October 30.

My Lord: We have the honor to acknowledge the receipt of your excellency's communication of this date, enclosing a copy of a letter publish-

ed in the *Dublin Evening Mail* of the 29th, in which Dr. Halpin, of Cavan, has proposed a plan for preserving the potato crop which he considers more worthy of public confidence than that which we had the honor to submit to your excellency.

It will be observed that the author of the letter under consideration does not state that he himself has tried the method which he proposes, or derived a knowledge of its advantages from the experience others. He merely thinks that it would prove efficacious.

We can, however, state to your excellency that a plan founded on the same principle, and at least as well adapted to practice, has previously been proposed in England, and experimentally tested by one of us. The result convinces us of its total inefficiency; and the cause of failure becomes manifest on considering the manner in which the disease is propagated, and the circumstances under which potatoes are placed in ventilating pits. In such places, potatoes being in contact are precisely in the condition best suited for the extension of disease, and against the danger of which we so strongly warned the public in our first report. Further, without giving any positive opinion whether the fungi found in decaying potatoes be the cause or the effect of the disease, it is quite certain that their presence aids very materially its rapid advance, and that their transmission from one tuber to another is one of the most ordinary means of infecting those potatoes which are at all predisposed to decay. Hence the isolation of each tuber is indispensable to its preservation, and hence our urgent recommendation to interpose some dry, solid substance between each potato.

If, as Dr. Halpin supposes, gentle currents of air did occur among potatoes collected in heaps in ventilating pits, then, in that case, the germs or seed of parasitical fungi, together with the emanations from any one decaying point, would be rapidly distributed over the entire mass of potatoes. We have to state, as our decided opinion, that in such a pit no current of air sufficient to dry the potatoes in the manner anticipated by Dr. Halpin could exist; or if it were produced, could only arise from inequalities of temperature, caused by the decomposition of the potatoes themselves.

We observe that Dr. Halpin has, in some points, mistaken the object of our report, more especially in supposing that the methods of storing which we have recommended are intended to be permanent. As yet, we have given no opinion on this matter, which involves such important considerations that we must delay our suggestions on the point until some further information has been obtained.

In the execution of the responsible duty intrusted to us by her Majesty's government, we have refrained from bringing forward any theoretical or speculative opinions, however plausible. Our former recommendations were founded on the results of experience, and we continue to recommend them with confidence. We have the honor to be your excellency's obedient and faithful servants,

ROBERT KANE,
JOHN LINDLEY,
LYON PLAYFAIR.

To Baron Heytesbury, *Lord Lieutenant of Ireland, &c.*

IRELAND—THE GOVERNMENT COMMISSION.

The following is the third report of the government commissioners:

" *To His Excellency Baron Heytesbury, Lord Lieutenant of Ireland, &c.:*

"My Lord: We have had the honor to lay before your excellency reports on the diseases in the potato crop, which have been distributed extensively throughout the country. Representations, however, have been made to us that the recommendations being in the form of reports, are not likely to be of that use which the more simple form of instructions might enable them to be. We have therefore thought it advisable to prepare the accompanying directions, in the hope that the methods recommended may be easily understood and promptly carried into execution.

" We shall immediately lay before your excellency our views upon the course which should be pursued with regard to seed for a future year.

" We have the honor to be your faithful and obedient servants,

"ROBERT KANE,
"JOHN LINDLEY,
"LYON PLAYFAIR.

" *Advice, concerning the potato crop, to the farmers and to the peasantry of Ireland.*

"The dreadful disease that has attacked your potatoes is one the effects of which you can only stop by strict attention to the advice of those interested in your welfare. Many plans have been proposed, and after examining them all, we recommend the following directions:

" All competent persons are of opinion that the first thing to bear in mind are the following directions:

" 1. Dig your potatoes in dry weather if you can; and if you cannot, get them dry somehow as fast as you can.

"2. Keep them dry and cool.

"3. Keep the bad potatoes separate from the good.

" 4. Do not pit your potatoes, as you have been accustomed to do in former years.

" 5. Recollect that if they get damp, nothing can make them keep; and do not consider them dry unless the mould which sticks to them is like dust.

" Do not take them into your houses unless you want them for immediate use.

" *Digging and drying.*—As you dig the potatoes, leave them in the sun all day; and if you can, throw them upon straw, turning them over two or three times. At night you may gather them together and cover them with straw, so as to keep off frost. Next day take off the straw, spread them out, and give them the sun again. Do this for three days running if the weather permit. If you put straw enough upon them at night they will not suffer.

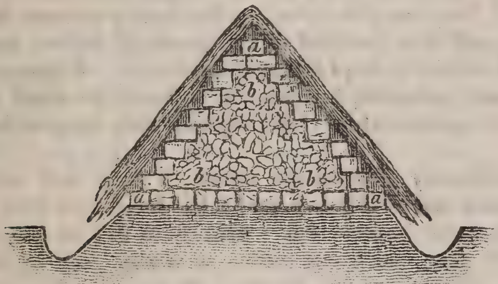
"If the weather be unfavorable, and you have a dry loft or out-house large enough to hold them, you may spread them thinly on the floor, allowing a free circulation of air so as to dry them there.

" They must be got dry.

"*Sorting the potatoes.*—As soon as they are dry you must sort them. Pick them one by one, and put in one heap the very bad ones; in another, those which are not so bad; and in a third, those that are sound. Treat

the bad potatoes as shall afterwards be directed, and store the sound ones according to the directions given in the next paragraph. You will know the very bad potatoes by their unpleasant smell, and the second set by their skin looking brown or dull, and not bright, as it generally does. A very little practice will teach you how to distinguish them easily from each other.

" *Storing.*—When the potatoes are quite dry and well sorted, proceed to store them thus: Mark out on the ground a space six feet wide, and as long as you please. Dig a shallow trench two feet wide all round, and throw the mould upon the space; then level it, and cover it with a floor of turf-sods set on their edges. On this sift or spread, very thinly, the dry mixtures, or any of the dry materials described below, and which you may call 'the packing-stuff.' Also, get some dry slacked lime, and dust all the potatoes with it as well as you can. Then put one row of turf sods, laid flat, on the top of the floor, all round the sides, so as to form a broad edge; and within this spread the dry potatoes, mixed well with the packing stuff, so as not to touch one another. When you have covered the floor in this manner up to the top of the sods, lay another row of sods all round the first, so that half of each sod may rest on the bed of potatoes, and the other half on the first layer of sods; this will make another edge one sod deep, which must be filled up with dry potatoes and dry packing-stuff as before. Then lay another edge of sods in the same way; fill it again, and so go on till the heap is made. When the building of this pit is finished, it may be covered with sods at the top, and will be ready for thatching. If rightly made, it will look like the roof of a cottage cut into steps.



" If you do not understand this, ask your landlord or your clergyman to explain its meaning, and we are sure that they will give you every assistance; also recollect that the recommendation applies only to sound potatoes, after being well dried.

" You will lose nothing by applying these materials in storing, for the turf can be burnt as you use up the potatoes, and the mixture of lime with dry sand, dry clay or ashes, which you are afterwards directed to employ, will form a good manure after having saved the potatoes. The only difference is, that you must get what you want now, instead of waiting till another time.

" After you have completed the heap, thatch it, so as to throw off the waters into the ditch and keep out the frost.

" In districts where there may not be spared turf sufficient to form the pits in the above way, make them as follows: Mark out the spot, and make the trench as before. Lay on the ground a floor of stones about as large as apples, and over them as much heath, brushwood, or twigs, as will just cover

the stones. On this floor form the heaps of potatoes, and packing stuff, just as described for the turf-pit. Cover the sides of the potatoes with more of the packing stuff, and thatch it in the usual way.

"We must again impress upon you that to put potatoes in your usual way is certain destruction to them.

"*Packing stuff.*—This, which is of the greatest consequence, may be prepared in either of the following ways—some of you may prefer the one, some the other:

"First way: mix a barrel of freshly burnt unslacked lime with two barrels of sand or earth, as dry as you can possibly get it. The lumps of lime should be broken into pieces as large as marbles, and the mixture should be left 24 hours; at the end of that time turn the heap well over, mixing together the lime and sand (or other dry materials) till no lumps of lime can be found.

"Second way: mix well equal quantities of earth and broken turf, or dry sawdust; put a few sods of lighted turf on the ground; place the mixture on them by degrees till a large heap is made; in a few hours the fire will have spread through the heap, which is then to be covered with earth so as to put out the fire. In fact, this is to be managed just as if you were burning land. This burnt mixture forms a very good kind of packing stuff; perhaps as good as the mixture of lime with dry materials.

"*What to do with bad potatoes.*—When potatoes are only slightly diseased, that is, when the disease shows itself only under the skin in small dark spots, or, at most, spreading into the substance of the potato for about a quarter of an inch deep, with a yellow, or light brown, or blackish color, without any smell, they may be eaten by the family without danger. They should be peeled, and the diseased parts pared off before they are boiled. The parts cut off should be kept for making starch. Potatoes thus treated are wholesome and palatable, but should be used for food as quickly as possible, as it is not quite certain that they will keep long without the greatest care.

"It is a pity to destroy potatoes for starch, if they will otherwise keep. Cut out the diseased parts, if it can easily be done, and dust over the cut parts with lime, and the potato also. Get them dry as soon as you possibly can; and if you have outhouses or sheds, you should keep the potatoes in them, also using the packing materials. In such cases you should allow the air to circulate freely in the sheds, and should frequently examine your potatoes, which should not be laid in layers above two or three feet in height. If you turn them frequently during the first two or three weeks, and keep them very dry, in this way they will probably keep. Although sheds or outhouses are to be preferred, if you have them not, and cannot construct them out of cheap materials, you should store the diseased potatoes by themselves, just as we have recommended you to store the sound ones.

"If, with all your care, the diseased potatoes still get worse, dry them thoroughly in kilns, or on hurdles placed over lime-kilns, or on screens or hurdles placed over low turf fires, after having cut the potatoes into two or three slices. It is only very bad potatoes that you should break up into starch.

"*How to save the value of very bad potatoes.*—Although nobody knows how to make bad potatoes into good ones, or to prevent many of them from becoming worse, yet it is possible to extract from bad potatoes, or from bad

parts of them, a great deal which is good. For this purpose proceed as follows. Provide yourselves with the following things: A rasp or grater, which may be made of a sheet of tin, or even of sheet iron bent round, and punched full of holes with a nail, a common coarse linen cloth, or hair sieve, hand sieve, or common cloth strainer, and a pail or tub, or two, to hold water.

"To make the bad potatoes useful wash them clean, and then rasp them into one of the tubs of water. The finer they are rasped, the more food will you procure from them. Having rasped a good many, take the cloth and place it on another tub; then put the pulp on the cloth, and pour water on it, allowing the water to run through. You have now two things to attend to —the pulp and the starch.

"First, attend to the pulp. Squeeze out as much water as you can from what remains on the cloth. You should wash it, however, till no smell remains. After you have squeezed it pretty dry, complete the drying on a griddle over a slack fire, and when it is dry put it aside for use.

"Next look to the milky water. It will then become clear, and the milkiness, which is starch, will have settled to the bottom. Pour off the water gently till the starch is tolerably well drained; then add more water, stir the whole well up, and let it settle again. As soon as it is again clear, pour off the water, and when you have got rid of as much as you can, put the wet lumps of starch on a shelf or other place to dry. In a few days it will be fit to pack up.

"Good wholesome bread may be made by mixing the starch with the dried pulp, peasmeal, beanmeal, oatmeal, or flour. You must bear in mind that starch is not food by itself.

"There will be of course a good deal of trouble in doing all that we have recommended, and perhaps you will not succeed very well at first; but we are confident that all true Irishmen will exert themselves; and never let it be said that in Ireland the inhabitants wanted courage to meet difficulties against which other nations are successfully struggling.

"ROBERT KANE,
"JOHN LINDLEY,
"LYON PLAYFAIR.

"Board room, Royal Dublin Society, *November* 3, 1845."

From the Gardeners' Chronicle and Agricultural Gazette, November 15, 1845.

FOURTH REPORT OF THE IRISH COMMISSIONERS.

Board-room, Royal Dublin Society,
November 7, 1845.

My Lord: Having laid before your excellency our views as to the best means of storing potatoes, and converting to useful purposes such as are too much diseased to offer a probability of being preserved, we now have the honor to bring under your consideration the question of seed for a future year. If in our former reports we have found it difficult to determine what course, under the peculiar circumstances of Ireland, it might be most advisable to pursue, we are still more embarrassed on the present occasion

in consequence of the conflicting testimony that has been presented to us, and the absence of all decisive evidence as to the cause of the potato disease.

The want of experience derived from previous visitations of the same nature, also renders it impossible to affirm in what manner the potato may be affected in the course of the next few months.

We have, however, endeavored to ascertain all that is positively known upon those subjects, by the examination of a great variety of published documents, both foreign and domestic, by personal observation, and by inquiries addressed to persons of practical experience or scientific reputation.

It is a very general opinion, and one entertained by men whose extensive knowledge entitles it to respect, that parasitical fungi, similar in their nature to those which produce mildew and dry rot, are the real cause of the malady.

It is stated that one of these plants, belonging to the genus "Botrytis," and similar to that which some years since produced great mischief among the silk-worms of France and Italy, has attacked the potato crop. It is described as entering the potato plant by the breathing pores of its leaves, and then passing down through the interior of the stem into the tubers, in which its mycelium or spawn fixes itself, traversing the cellular mass, separating the cells themselves, causing alteration in their chemical condition, and thus producing decay. In other cases, where the spawn is not apparently distinguishable in the diseased portions of potatoes, even by the most practised observers, it is suggested that the juices of the plant may be vitiated by the parasite which destroyed the leaves, and that particles of it, too obscure to be distinguished by the eye, may be circulating with the juices, and producing disease by irritation. The presence of the parasite is not to be detected by the naked eye, unless it makes its appearance on the outside of the potato in the form of mouldy tufts; but its spawn may be detected in the diseased portions by the microscope, whether any external indications of its presence can be perceived or not. Hence it is inferred that it is produced exclusively from within. It is, however, within our knowledge that, when apparently sound potatoes are pitted in places where the mouldiness of a diseased potato is able to appear, that mouldiness rapidly establishes itself on the sound potatoes at every point where their surface has been wounded or bruised, and that, under such circumstances, the disease is immediately extended through the entire mass.

That the spawn of fungi is present in large quantity in diseased potatoes is undoubted. The evidence of the best microscopal observers would be with us conclusive on that point, even if we had not verified the fact by personal examination. We also regard it as well ascertained that these parasites spread rapidly in warm and damp situations, producing infinite mischief under such circumstances, and that their advance is only to be successfully resisted by dryness. But it does not appear to us that their being the original cause of the disease has been well established. If it were so, it is difficult to conceive why fields of potatoes placed very near each other should be differently affected, or why certain varieties of this plant should be much more injured than others: the Irish apple potato, for example, which appears to have suffered more extensively than any other. We are also unable to reconcile with the theory of the potato disease being caused by parasitical fungi, the remarkable fact that, in its present form, it is certainly of modern origin. That it may have always existed is possible, though of this we have no proof; but at least there can be no doubt that it has only mani-

fested itself to any considerable degree within the last few years. We cannot suppose the Botrytis, which observers find to be the kind of fungus that attacks the potato, to be a recent creation. We must assume it to have been co-existent with the potato itself, and therefore we must conclude that some recent causes have come into operation favorable to its increase to the present alarming degree.

Without pretending to decide what that cause really was, we may state that it seems to be connected with the cold, cloudy, ungenial weather which has characterized the present year over the north of Europe; conditions highly unsuited to the constitution of a plant which, like the potato, is a native of a warm, dry, sunny country, and insufficient for the ripening of the tubers.

Without adverting to solitary cases, which require to be examined with more care than we have the means of giving to them, we may state, that amidst the mass of conflicting evidence which we have obtained, the following facts appear to be established:

1st. That potatoes planted early in the season are more healthy than those planted later.

2d. That the crop has suffered less in dry, elevated, sandy districts, where the influence of the season was mitigated by the slowness of the growth, or compensated for by the natural warmth of the soil.

3d. That the late varieties of potatoes are more diseased than early ones.

4th. That the present disease seems to be confined to the northern parts of Europe and North America, and to be unknown in the countries southward.

If we are right in the conclusion at which we have thus arrived, there will not be cause for serious alarm as to the crop of another year, unless an equally unfavorable season should be experienced, or the supply of healthy seed should be insufficient, or that the parasite should be found to have so entirely taken possession of this year's plants as to overcome the natural power of living bodies to repel the attacks of such enemies to healthy vegetation.

To Providence we must turn, in the hope that a second season like this may not be visited upon us. Should the Almighty, in his infinite mercy, avert such a misfortune, we entertain confident hopes that the two other sources of danger may be guarded against by human foresight and diligence.

In providing seed for a future year, we may look with confidence to such potatoes of home growth as shall have resisted all tendency to decay during winter; and we trust that a considerable quantity of them will be found remaining, where the precautions for storing, which we have recommended, shall have been observed. We do not anticipate any danger in the use of them, if they are planted early; especially if, before being planted, they are exposed to light till they become green. Another source of supply may, doubtless, be found in the southern parts of Europe, where, we have reason to believe, the disease has not shown itself; and we would strongly advise the public to lose no time in securing what may be procurable from that quarter.

It is stated by M. Seringe, secretary to the commission appointed in the department of the Rhone, in a report just published by him on the potato disease, that it is unknown to Genoa, and in the warmer countries. Our own advices describe the crops about Marseilles as being perfectly healthly;

and therefore we may conclude that mercantile enterprise will make up, by importations, a large part of the deficiency to be apprehended.

It has also been ascertained by actual experiment that potatoes, although diseased, will grow and produce apparently healthy plants.

The Rev. Mr. Berkley, a gentleman eminent above all other naturalists of the United Kingdom in his knowledge of the habits of fungi, and whom we have consulted on this occasion, states, that although there would certainly be some risk of raising a diseased progeny from a diseased stock, yet the growth of fungi so evidently depends on atmospheric conditions, that it does not follow that because germs are present they should be developed. We cannot, however, recommend the use of diseased tubers for seed, except by way of experiment, or in cases of absolute necessity; and it will always be prudent to dust them with powdered lime before they are used. It would indeed be proper to do so even when sets, however sound in appearance, are employed; for this process will destroy the minute seeds of parasitical fungi which may be sticking to the sets, and assist in repelling those which are lying in the ground; of course, those potatoes being selected which, on careful inspection, show no sign of disease, and hence afford the fairest prospect of a sound and healthy growth.

Where home-grown sets are to be employed for another crop, we would suggest with very great confidence the adoption of the system of autumn planting—a method of cultivation which has been proved advantageous in regard to the crop, which is attended with no unusual expense, and which seems particularly adapted to the circumstances of the present case. It has been shown by Mr. Grey, of Dilston, that in Northumberland his potato crop has been considerably increased in quantity by this practice, and that he has no disease in it this year. In 1844, his autumn-planted crop produced 100 and 111 loads, when the same quantity of spring-planted land yielded but 80 loads under the same circumstances.

And in the present season, this gentleman states that his autumn-planted is one-third better than his spring-planted crop. There can, therefore, be no doubt that the autumn-planting may be safely practised. On this occasion, it has these peculiar advantages—that it offers an additional chance of security against renewed attacks from parasitical fungi. On this point, the evidence of Mr. Berkley is positive.

"Autumn-planting," he says, "seems to me to offer the best chance of obtaining healthy sets. What are now planted will produce their tubers before the atmospheric conditions requisite for the growth of the parasite in the leaves can be realized; and without such growth, the particles, if present, will be too few to cause much evil. I think, under existing circumstances, the commissioners cannot do a greater service than by encouraging and enforcing as much as possible autumn-planting." Concurring, as we entirely do, in this recommendation, we trust that the planters of potatoes who have it their power to adopt it will do so at once.

All that we conceive it necessary to state, with reference to this practice, is, that it should be performed at any time before the end of January; that the sets should be thoroughly dried by exposure to light and air; that they should also be well dusted with lime; and that they should be planted in drills six inches deep, with farm-yard manure below the sets. We also recommend that where the potatoes are not large they should be planted whole, and even large potatoes should be cut into not more than two pieces.

We have ascertained that autumn-planting has already been practised

throughout Fingal, for the early supply of the Dublin market; and that although the practice has been nearly discontinued, that has not happened for any reason that affects the present question.

Neither can we learn that the early period at which the leaves appear above the ground in spring is attended with any greater risk than what attends precarious crops like the potato in any season. The effect to be anticipated from autumn-planting consists not merely in a probable increase of quantity in next year's supply, but in the saving of potatoes which may perish before spring, if the slow growth which goes on during winter is arrested, and in the early ripening of next year's crop, in the event of a second unfavorable season supervening. We may add, that experience has shown the small refuse potatoes of the year to be suited to autumn-planting, if sound, and prepared in the manner we have recommended.

It has been supposed by many persons that the potato has arrived at a state of general debility, and that the crop will continue liable to disease like the present, until new varieties shall have been raised from seed. We do not find any satisfactory evidence to support this opinion. It is doubtless true that great constitutional differences exist among the varieties of the potato, and that some are much more delicate than others; but we do not find that the oldest varieties are the most tender, or the newest the most hardy. On the contrary, it is within our knowledge that in the present season very healthy varieties, recently raised, have suffered much more than kinds that have been long in cultivation.

While, however, we withhold our assent to the proposition that newly raised varieties of the potato were exempt in any peculiar degree from the attacks of disease, we fully admit the fact that some varieties are much more subject to it than others; and we therefore recommend the cultivation of the tender kinds to be discontinued, and those alone be used for future cropping which the experience of the present year shows to be best suited to unfavorable seasons; and on this point we may further remark, that all concurrent testimony points out the Irish cup variety as that which has suffered least from the attacks of the disease.

We are also of opinion that it will be imprudent to plant potatoes for the next crop in land which has been just cleared of them. The latter is in all probability filled with the seeds of the fungi, countless myriads of which must have been scattered over the tainted fields; and although they probably have been borne by the winds to every portion of the country, yet it may be conceived that the soil will be more impregnated where diseased potatoes have just been growing, than in fields in which decaying matter was not absolutely present.

Under these circumstances, we are decidedly of opinion, that prior to putting any kind of crop, for the coming year, into land that has been this season under potatoes, it will be prudent, if not absolutely necessary, that the ground should be turned up and exposed to the action of the atmosphere with care, and that it should be thoroughly manured with lime. We have already recommended that the potatoes, whether whole or cuttings used for seed, should be dusted over with lime previous to planting; and we further urge that in the case of corn, or seed crops of every kind, the seeds should be steeped in lime water, or in the solution of bluestone and salt, well known to farmers. Evidence has already been laid before us of injurious effects where such precautions as we have described have been neglected.

We forbear from adverting to the possibility of replenishing the diminished supply of potatoes by sowing the seeds formed by the flower. This is an operation which can only be carried on successfully in a garden; is unsuited to the means of the small cultivator; cannot in any way affect the question of immediate supply, and may be safely left to the intelligence of the gardeners scattered throughout the country.

Hitherto we have laid before your excellency, for the purposes of publication, several reports in a merely popular form, suited to the present emergency. We are confident that the recommendations contained in them, if carried into effect, will tend to mitigate the evils arising from the attacks of the disease in the potato crop. We now propose to proceed forthwith to apply ourselves to the investigation of the important scientific questions involved in the subject, and to report in due time the results of our inquiries, in order that from past experience we may derive knowledge for future guidance. These investigations will occupy us for a considerable time, and while we do not contemplate the necessity of publishing furthur popular directions, we shall hold ourselves in readiness to give our immediate attention to any question which your excellency may submit for our consideration, or to report from time to time for your excellency's private information.

We have the honor to be, my lord, your faithful and obedient servants,

ROBERT KANE,
JOHN LINDLEY,
LYON PLAYFAIR.

FIFTH REPORT OF THE IRISH COMMISSIONERS.

ROYAL DUBLIN SOCIETY, *November* 8, 1845.

MY LORD: We take occasion to mention to your excellency some facts regarding the action of peat or turf upon diseased potatoes, which we are anxious to make known without delay; although at the present moment we do not wish to put forward a formal report, or official recommendation.

We had early fixed our attention on the preservative action of turf, and in our first report gave some directions for its use, since which time we have received accounts of its decisive utility in many cases. We had also obtained very distinct evidence that in wet, bog land the disease was in reality milder and less extensive than in drier and more fertile soils. Upon these grounds we proceeded to institute experiments on the action of bog water on diseased potatoes; and we find that certainly, when immersed therein, the disease appears to be arrested, and the substance of the potato does not appear in any way to suffer.

Our trials have been made in Dublin, and but on a small scale; and also the pressure of circumstances forcing us to make known every plan likely to prove useful without loss of time, we do not wish to have this notice considered as decisively stating that steeping in bog water will stop the progress of the disease; but we consider it highly important that the plan should be tried by persons residing in bog districts, where circumstances render a possible failure in a certain quantity an object of no importance.

We have accordingly applied to several gentlemen to institute trials on

a large scale, and shall, when we learn the results, at once proceed to lay them before your excellency.

We remain your excellency's obedient and faithful servants,

ROBERT KANE,
JOHN LINDLEY,
LYON PLAYFAIR.

On the first of these reports the public has still to pronounce judgment. It is at variance with opinions held in estimation by many careful inquirers, and it is probable that the correctness of the commissioners' views will be called in question.

The disputable matter may be divided into two parts. In the first place, the commissioners reject the theory of parasitical fungi being the cause of the evil, which they refer to atmospheric influences. As this is what has been always maintained by ourselves, it is needless to insist further upon that point until more proof shall have been brought forward in support of the fungal theory.

The other point is the wearing out of races. It has been repeatedly asserted that the reason why the potato is now suddenly attacked by a malaady which at one time threatened its destruction, is, that it has degenerated. This has more particularly been insisted on in a frothy pamphlet noticed in another column; and all on sides we hear of recommendations that new varieties of the potato should be immediately raised from the seed. In this, as in all other matters, it is easy to make assertions; but, before we give assent to them, we must ask for some proof of their truth.

Do the gentlemen who clamor for new varieties know which are the old varieties now cultivated, and which the new? Have they any proof that the old varieties have suffered in any peculiar degree, or that the new varieties have escaped? Can they point out any one instance among potatoes, in which facts support their views? We think not. At least they have not done so; and we therefore entirely agree with the commissioners in rejecting this hypothesis.

That the new varieties do not escape, we have the most positive proof. Doctor Maclean, a gentleman in all horticultural affairs, raised but the other day a seedling potato of great vigor and excellence. Its production is so recent that few persons yet possess it at all.

With this variety a portion of an old meadow, newly trenched over, near London, was planted in the autumn of 1844 and spring of 1845, no manure being used. The crop was so much attacked by the disease that not a single potato was found worth preserving; and the difference between autumn and spring planting, which Doctor Maclean's new potato was selected for the purpose of determining, could not be ascertained. In reality, there is no proof in any part of the vegetable kingdom that the races of plants wear out. Such an opinion was entertained, indeed, by the late Mr. Knight, and his views have been adopted by some physiologists. Yet there is not only no proof of their correctness, but the strongest presumption to the contrary. It is superfluous to say that the golden pippin apple is the instance on which this theory mainly turns. It is said that it has worn out, and can be no longer cultivated. But the golden pippin still appears abundantly in Covent Garden market: trees as healthy as ever are to be found in this country; we ourselves have seen it in Ireland, where there is no symptom of its decrepitude; and in Madeira it is in robust health.

The wearing out theory, therefore, falls to the ground. We observe the commissioners recommend all land which has borne diseased potatoes to be well limed before being recropped. They give no reason for the recommendation, but probably regard it as a prudent precaution against two possible dangers. It is improbable, but not impossible, that the myriads of seeds of fungi lurking in the soil may attack a new crop; that kind of danger will be arrested by the use of lime, which absolutely destroys such parasites. It is not improbable that decaying potatoes, left in the ground, may destroy such young roots as come in contact with them before the putrid matter has become decomposed; lime again hastens its decomposition, and therefore becomes a valuable agent in such a contingency. It may be that these fears are groundless, and that danger is not to be anticipated; but no prudent man, acquainted with the nature of plants, would venture to assert what will or will not follow in the train of such a pestilence as that which has attacked the potato. Professor Henslow, indeed, has furnished us with an instance of the deleterious effects of decaying vegetable matter upon young plants, which is particularly instructive at the present crisis.—*Ed. Gard. Chron.*

From the Edinburgh Witness.

INVESTIGATION OF THE POTATO DISEASE.

We are glad to learn that a special subscription is at present being raised among the agriculturists of Scotland, for the purpose of defraying the expenses of an investigation of the potato disease, or murrain, which is at present spreading so alarmingly throughout the three kingdoms. The proposed inquiry is to be chemical, botanical, entomological, and practical; the latter embracing inquiries as to the extent, appearance, and general characters of the disease in the different districts; the nature and condition of the soils in which it has appeared; the mode of treating and manuring the crops, &c. It is proposed to intrust this investigation to Sir William Jardine, Bart., of Applegarth, for the entomological branch; Dr. Greville, of Edinburgh, for the botanical; and to Professor Johnston and Mr. Fleming, of Barochan, for the chemical and practical part of the inquiry, with such other assistance as they may think proper to obtain. The sum required for this investigation is, we understand, five hundred pounds—a sum which, considering the vast importance of the subject, there will, we should hope, be little difficulty in collecting. The results will be published as they are obtained, and in a cheap form, so as to be accessible to all. The Highland Society has also offered a premium for analyses of diseased potatoes, the results to be sent in to them at the close of 1846.

POTATO ROT.

The Edinburgh Quarterly Journal publishes a letter from Professor Johnston, in which he remarks: "This disease in the potato has already called forth many hasty opinions, almost all *partially* true, because founded on one or two facts, but nearly all unsound as general expressions of the

truth, since they are contradicted by the experience of other practical men in other districts of the country. We are clearly unable as yet to assign either any general cause for the disease, or any universal remedy. Something may possibly be suggested by the analysis of sound and diseased potates, for which the Highland Society has offered a premium; though in the present state of our knowledge upon the subject, even this is doubtful."

From the Farmers' Library.

POTATO DISEASE.

Report on the cause of the potato disease, by C. Morren, Professor in the University of Liege; together with a preventive remedy.

It is known that a general malady has stricken the potatoes in Belgium, and it appears that the crop of this most necessary production is there much compromised. As it is said that this malady threatens also the potato crop in France, we believe it right to reproduce here the advice that Mr. Morren, Professor of Agriculture at the University of Liege, has addressed to the public in a letter that we find in "The Independence," of Brussels. Mr. Morren, after stating that this evil has for several years existed in Belgium, although in a less alarming degree, adds:

"The true cause of the evil is a mushroom, a mouldiness the learned will class in their genus 'botrytis,' but that the agriculturists hardly distinguish, which they call a burn, a fire, a stain, and which some attribute to humidity—others to dryness; some to a bad wind coming from France—others to insects, &c., &c. It is not, however, indifferent to us to know the true cause of the phenomenon, for this knowledge will put us in the way of diminishing the scourge, and possibly of destroying it.

"For some time I have followed every day, and step by step, the progress of the evil, in observing several fields of potatoes. The malady commences decidedly in the upper part of the leaves. I have even seen the flowers and fruits attacked in the first place. A part of the green tissue loses its tint and turns promptly yellow; the stain soon becomes more gray below, and it is always on the lower surface of the leaf, or on the fruit, where, a day or two after the appearance of the yellow stain, a whitish down shows itself. The microscope discovers then that this down proceeds from a mushroom which grows between the numerous hairs which garnish the bottom of the leaf of the potato. This mushroom is of an extreme tenacity; but it breeds and reproduces itself by thousands. Its stems are formed of little straight and partitioned threads, which have at their summit one or several branches, always divided in two; and at the end of these branches reproducing bodies develope themselves, which have the form of eggs, but which have not more than the hundredth part, or even less, of a millimeter in size. I may be told it is a very small body to commit ravages so great; but I answer, the itch is not the less to be feared because the animalcule which produces it is a microscope being.

"After the formation of the yellow spot, and the development of the 'botrytis' on the leaf of the potato, the stem receives the deleterious influences. Here and there its surface becomes brown, blackens, and when the phases of the evil are followed with the microscope, it is soon perceived that

the stem is attacked through the back. The morbid agent carries its action from the bark to the skin, and although this does not always offer mushrooms, it is not the less stricken with death ; for to any one that has some notions of vegetable physiology these effects easily explain themselves. The sap modified into living juice, into vegetable blood, forms itself in the leaf, and then descends into the stem and the root, by the bark. Here this sap is sick, modified—it carries the poison of the leaf into the stem, and this perishes. Indeed, so soon as the black spots declare themselves on the stems, the leaves become dry and die. Blackened and stricken with death by a venomous mushroom, they fall, unfortunately, to propagate the source of the scourge, or to deposite its germ in the earth. I will soon indicate the means which should be taken to prevent this fatal communication.

"The infection soon descends into the tubercle itself. If the evil follows its course, the tubercle immediately gangrenes. A potato is not a root, but a branch. It follows from that, that a tubercle possesses a marrow, which is the eatable part to be preferred, and a distinct bark. Between the marrow and the bark is found a zone of vessels which represents wood. One can easily understand this structure by cutting a thin slice of potato and placing it between the eye and the light. Now, the infection attacks the part which receives the descending sap—that part where the morbid agent has itself descended. Upon a potato being attacked, one perceives a series of livid spots, brown or yellow, sometimes gray or blackened—a series which extends itself throughout the woody zone. In following the process of the evil over a great number of spoiled tubercles, I could see how the disease, increasing by small degrees, finishes by reaching the heart itself of the potato, and corrupts it entirely. The skin of the sick potato easily detaches itself ; the flesh no longer cracks under the knife ; a discolored flaccidity, a fade, and later an animal smell, analogous to that of mushroom freshly cut, declares itself and carries off the heart. The animals even refuse to eat a food which may be regarded to be quite as injurious as deteriorated mushrooms themselves.

"So soon as the potato is gangrened within, that is, in its cortical part, but a few days, three at the most, are sufficient for the mushroom (the 'botrytis') to show itself without. This white efflorescence is seen to declare itself in the eyes of the tubercles, and then extend itself like light, white flakes, at first upon a rounded surface, but which finishes by invading the whole tubercle. The potato is then entirely lost.

"The source of the evil being known, all the attention of the cultivator should be directed toward the destruction of the mushroom ; for it is unfortunately too true that the blight, the rust, and all the race of parasites, once introduced into the country, they remain there and propagate themselves. This year the epidemic has been general—everywhere the germs of it exist ; millions of that which propagate it, if their number be not diminished, will attack plants the approaching year, and it will then be more difficult than ever to eradicate the plague, to do which it is essential to adopt the following means :

"1st. When the leaves are lost, they must be collected as quickly as possible, and burnt upon the spot, without being transported to a distance. The ashes may be spread upon the soil. In collecting them they must be shaken as little as possible. I have seen with regret the farmers collect the sick leaves, to preserve them in a pile in the field, or to cast them over the hedges. This is to preserve the plague for the next year.

"2d. When certain varieties of the potato, or certain localities, are free from the calamity at the time of the crop, it is always prudent to burn the leaves; for a field may appear clear of the 'botrytis' when it is not so. Several leaves are attacked; these leaves throw out the seeds of the disease upon the tubercles, which, preserved as seed, will preserve the disease the next year.

"3d. If the tubercles are themselves attacked, it is essential to take them out of the earth to make a prompt choice out of them, which is easy, for habit soon enables one to recognise the spoiled tubercles from those which are not so. The sound tubercles ought to be used as soon as possible, for they are not injurious up to the moment the bark becomes yellow. The smell alone is sufficient to detect the development of the malady. The sick tubercles should be burnt.

"4th. To obviate the sorrowful consequences of a crop which will be always reduced either a half, or a third, or even less than an ordinary crop, it would be important to follow, in our country, the method practised in Scotland in cultivating potatoes during winter.

"5th. Since it is very probable that the seed tubercles that may escape from the present crop will be infected with the germ of the mushroom, it would be well if, by the intervention of the government or commerce, the farmers had at their disposal pure seed tubercles, that were not infected; and for this purpose the potatoes of Pennsylvania or Ireland would suit us exceedingly well. The plague is not known in those two countries. We must distrust the potatoes of Germany, where the dry gangrene, the shrivelling, *(la crispure)* and the ulceration of the tubercle, are but too common; and we might take advantage of this importation to endow the country with those varieties of potatoes which are most congenial to our soil.

"6th. If the farmers are obstinate in employing, as seed, tubercles of this year's crop, it will be necessary to subject them to liming, as is done with wheat, rye, oats, and all plants which are subject to be invaded by parasites. The liming ought to be done by immersing the tubercles, because the study of the habits of the 'botrytis' shows it is the eye, the deepest point of the potato, which is attacked. The limed water should then bathe this leprous eye. Twenty-five kilog. of lime, one-quarter pound of the sulphate of copper, and three kilog. of marine salt, to 125 litres of water, constitute a liming of which the useful effects have been acknowledged by a great number of instructed cultivators.

"7th. In the plantings either of the winter of 1845 or the spring of 1846. it is essential to plant in potatoes parcels of ground as distant as possible from those infected this year, for it is easily understood that the chance of transmission, by the preservation, in the soil, of the seed of the mushroom, is much greater in plantings that approach each other than if they were made at a distance.

"8th. When the Counsellor de Martens visited Belgium, and inquired in our different provinces the state of our potatoes, he informed me, in one of his interesting conversations, that the farmers on the borders of the Rhine had remarked that the dry gangrene attacked oftener the potato plantings made in the afternoon, than those made in the morning; and he explained this phenomenon, which at first appeared singular, by a simple fact. When the sun has passed the meridian, the heat of the strata of air is at its maximum: this heat accelerates the vitality of plants; that which propagates them flies more rapidly in a dilated air; the insects,

in their flight, disperse with facility a mass of little bodies, of which the air is the vehicle; and the dissemination of their germs is then also at its maximum. The farmer is plunged in this atmosphere, and he causes to pass through it the potatoes which he plants; it attaches itself to the seed, and is sown with it; and that happens here which occurs to the grain not limed—the poison is sown and grows with the plant, to attack and kill it at a later period. From which arises the advice we give to the farmers, to plant their potatoes in the morning.

"9th. The employment of lime and marine salt, mixed with a small quantity of the sulphate of copper, is, as I have said, of a recognised efficacy in the destruction of the germs of parasite plants; consequently, to powder with these mixed substances the soil which has been planted with sick potatoes, is an operation calculated to destroy the germ of the scourge, and cannot be too strongly recommended everywhere.

"10th. The preservation of the potatoes that have escaped being attacked this year, in cellars, &c., will certainly deposite in these places the germ of the mushroom. To cleanse these cellars and whitewash them with lime, are excellent means of destroying the germs; and to spread lime and pounded coal on the places where the potatoes have been deposited, will finish the series of proceedings we consider the most rational, and the most certain to destroy, if it be possible, the evil at its root.

"CH. MORREN,

"*Member Royal Academy of Sciences, &c., University of Liege.*"

POTATO DISEASE.

To the Editor of the Durham Advertiser:

SIR: The investigation of the potato disease having been taken up on a large scale, I have been requested to undertake the chemical part of that investigation. I have in consequence drawn up the following queries for the purpose of obtaining information. They have already been widely diffused in the form of a circular. I hope you will have no objections to give them a still wider circulation through the columns of your journal, and you will oblige, sir, yours truly,

JAS. F. W. JOHNSTON.

DURHAM, *October* 27.

Queries in regard to the potato disease.

1. To what extent has the potato disease appeared in your district, or county, during the present year? Is the general crop large? and how much of it do you think is affected?
2. Is it more extensive during the present than during the past year?
3. How many years is it since it first began to be noticed among you?
4. At what time during the present season did it first appear in your neighborhood? Has its appearance been sudden and unexpected?

NOTE.—A letter from a Mr. Gilchrist, of St. John's, New Brunswick, dated 27th September last, contains the following passage: "I never was

more surprised at any thing than the change upon the appearance of the country from the time I had gone through it two months before. At that time every thing looked beautiful, and crops of every kind seemed abundant; but now a blight seems over every thing. From Halifax to St. John's I did not see a single field of potatoes but what was completely destroyed; and it is universal throughout the whole of North America. So bad are they upon St. John's river that the health officers have forbid them being brought to market; and from what the country people say, there will be scarcely enough left for seed. It is a strange sort of disease. It first attacks the shaw, and so rapid is it that in the course of two or three nights a whole field will be destroyed, and the stench that arises from them is almost unbearable."

5. What peculiar appearance has it presented? Does it differ in character from the disease of former years? Does it generally show itself in the leaf and stem before it appears in the bulb?

Note.—The rot in the tuber of the potato assumes two distinct characters, known by the names of the *dry* and the *wet* rot. The former, which has hitherto prevailed most in this country, has the appearance of brown or brownish-black streaks, spots, or layers in the potato, beginning at the outside and extending inwards, often to the very core. The affected potatoes often appear sound externally, though upon a closer inspection the seat of the disease may be traced by a slight wrinkling or discoloration of the skin. In many cases the disease appears first at the end of the potato most distant from the root. In others, it is the prominent eyes at the side of the potato which are first attacked, presenting a blue or livid appearance, and exhibiting, when cut, the brown fungus within. Potatoes with this form of the disease are often difficult to boil soft. When far gone, they have a disagreeable taste and smell after being boiled, and they not unfrequently decay after being pitted.

The *wet* rot forms an ulcer or distinctly decayed and rotten part in the potato. It sometimes appears as a rotten hole proceeding from the heel of the potato, where it is attached to the rootlet; sometimes it forms a soft mass over a large part of the surface, which can easily be pushed off by the thumb; and sometimes it appears sound externally, and yet may be crushed together in the hand.

The rotten portion has frequently the consistence of paste, "with tenacity sufficient to rope when held up, and the semi-fluid mass strings down like honey."

6. On what soils is it most prevalent; on light or heavy, on wet or dry, or on all soils equally?

7. Has it, to your knowledge, appeared on peaty or on newly broken-up grass lands?

8. In what varieties of potatoes? Have old or long cultivated varieties failed more than new or recently introduced varieties?

9. Are varieties raised from seed, to your knowledge, liable to failure?

10. Have potatoes planted whole shown any difference in the extent of failures?

11. Has the previous draining of the land any effect in preventing the disease?

12. Has the kind of manure applied any influence on the appearance or fatality of the disease?

13. Do you think the want of lime in the land is any cause of failure?

14. Does it, in your district, attack particularly fields or farms, and what are the peculiar conditions of these farms?

15. Does nearness to the sea or the use of sea-weed make any difference?

16. What is your opinion of the cause of the disease?

17. Do you think you have in any way contrived to prevent it during the present or past seasons; and how?

NOTE.—An American agriculturist says: "I have used slacked lime, which I sprinkle on the potatoes as soon as they are cut for seed, and shovel them over in it, and plant them immediately. Since I have adopted this plan I have not lost a potato, either in the ground or after they were put in the cellar; and such of my neighbors as follow my example are alike fortunate, and in no way troubled with the rot." This was written in 1844.

In Scotland, some practical men have supposed that, by the use of saline or chemical manures, they have been able to prevent it.

18. Has the peculiar wetness of the season, in your opinion, had any thing to do with its occurrence in your neighborhood?

NOTE.—The American Report for 1844 contains the following passage: "Notwithstanding the intensity of the drought, and its long continuance, the potatoes in this section of the country are rotting to such an extent as to destroy nearly the whole crop."

19. What are the first symptoms of decay after storing?

20. It is said that the rot spreads faster after the potatoes are put together in heaps or pits than when left in the soil, and late digging or leaving them all winter in the soil is therefore recommended. What practice would your experience lead you to adopt?

21. How would you recommend that the potatoes should be stored during the winter? Will a sprinkling of slacked lime, or of salt, or pounded charcoal, or charred peat, or wood ashes, be beneficial? Will washing the potatoes clean, and then picking and drying them before storing, help to preserve them?

22. What precautions would you adopt in preparing the seed in spring?

23. Have any cases occurred in your neighborhood in which the use of *diseased potatoes* has been injurious to animal life?

24. Are you able to forward to me any striking examples of *very healthy* or of very diseased potatoes from your neighborhood, or specimens of insects or of fungi you suppose to infest the potatoes, for the purpose of chemical, botanical, or entomological examination?

JAS. F. W. JOHNSTON.

From the London Mechanics' Magazine, &c.

ON THE POTATO DISEASE.

BY ANDREW URE, M. D., F. R. S.

The vague and contradictory statements concerning the nature of this calamitous visitation of Providence, as well as the directions for the treatment and preservation of the tubers, generally impracticable and preposterous, which have recently issued in vast variety from the press, do little honor to economic chemistry. It is needless to notice all the notions and schemes which have either officially or spontaneously been projected. On-

ly two of these deserve comment. The first as coming from a great master in science; the second as emanating from the Irish commissioners.

Professor Liebig imagines the essence of the disease to consist in the conversion of the albumen, a usual constituent of healthy potatoes, into casein, a principle which, by its great instability of composition, is supposed to cause the potato to putrefy rapidly.

I have subjected this opinion to the test of experiment. Perfectly sound potatoes, as also diseased ones, were sliced or grated and separately digested in a very dilute alkaline ley, at a blood-heat. The infusions, when cool, being filtered and faintly acidulated with dilute acetic acid, afforded respectively a like proportion of casein-looking flakes. It would thus appear, from this mode of testing, as prescribed by M. Dumas in the seventh volume of his "Tracté de Chimie," that *sound* potatoes contain as much as *unsound*.

Professor Liebig's plan of preserving diseased potatoes is founded on the above notion, and consists in cutting them into slices one quarter of an inch thick, and steeping them twenty-four or thirty-six hours in dilute sulphuric acid. On this proposal, I need make no comments, as it has no chance of being practised beyond the precincts of Giessen.

In the Pharmaceutical Journal for October last, I inserted a few observations on diseased potatoes, chiefly with the view of showing that till the putrefactive stage commences, the potato had the same acidulous reaction as in the sound state; but that *then* a portion of ammonia made its appearance, as was proved by its alkaline action on litmus paper, and by its covering over in distillation. That brief notice was written while I was at a distance from home on professional business, and where I had no means of prosecuting my experiments.

At my first period of leisure since, I resumed my inquiries, and have obtained certain results which may probably be found useful as well as interesting.

Before entering into a detail of them, I shall shortly describe the constituents of sound potatoes, according to the most authentic analyses.

Their average composition in 100 parts, according to Eenhof and Lampadius, is—Fibrous matter, 7; starch, 15; vegetable albumen, 1; gum, acids, and salts, 3.5; water, 75. Besides these principles, Vanquelin, by his older and more minute analysis, discovered the following in minute quantities: Crystalizable asparagin; an azotised substance resembling gum; a resinous matter, emitting an agreeable odor when heated; an extractive matter which blackens in the air; citric acid; citrates and phosphates of potash and lime. * * * * * * * * * * *

The nutritious quality of potatoes resides chiefly in the starch, fibrine, and albumen; the latter being essential to the formation of blood. * * *

In the diseased potatoes a portion of the starch is transformed into sugar, and of the albumen into an acrid offensive brown substance. If such tubers as are characterized by brown spots in the interior, and a thickened brown skin, both composed of fungus fibres, be grated or sliced and exposed to pressure, either alone or with a little tepid water, the juice obtained will be found to have a mawkish sweet taste, followed by a sense of pungency on the tip of the tongue.

If some of this juice be mixed with a little of Trommer's grape sugar test, (an alkalized solution of sulphate of copper.) this blue-colored mixture will change into a bright orange hue, slowly in the cold, but rapidly

on application of a gentle heat, with a deposite of protoxide of copper. By means of a modification of that test, described by me in the "*Pharmaceutical Journal*," for July, 1842, I have ascertained the existence of about five per cent. of saccharine matter in diseased potatoes; yet by the same re agent, which is sensible to $\frac{1}{100}$th of a grain of sugar, I could observe none of it in sound potatoes. After satisfying myself, in this way, as to the presence of sugar in diseased potatoes, I proceeded to verify the fact by placing their expressed juice, as also their infusion, in contact with a little yeast, at a fermenting heat of from 80° to 90° Fahrenheit, and watched the resulting phenomena.

A fermentative action soon began, and in an hour or two became so brisk as to throw up a thick creamy froth, like that occurring with small beerwort. At the end of thirty-six hours, the liquor having considerably diminished in specific gravity, was subjected to distillation, and yielded alchohol equivalent to about four per cent. of sugar in the potato. * * *

The vinous spirit produced is by no means disagreeble in taste or flavor, and may be easily rectified into excellent alcohol, fit for every purpose of arts, manufactures, and pharmacy.

Were it not for the oppressive laws of the excise, sufficient alchohol might thus be obtained this season for the uses of a temperate people, reserving an equivalent portion of grain from the whiskey manufacture for their sustenance.

The residual cake of the diseased potato is well adapted for feeding cattle, the morbid juices having been separated; and it may be so dried as to keep unchanged for a moderate length of time.

In all the diseased potatoes which I have examined with the microscope, the fibres of a fungus, called *botrytis*, from its grape-like form, or of one called *uredo tuberosum*, may be observed ramifying round the cells which enclose the starchy corpuscles. Now these plants, however minute, are not self-generated, but must be produced by some seminal impregnation, transported by the atmosphere, and peculiarly adapted to fructify, upon the *solanum tuberosum.* I would hence conclude that the potato disease is a peculiar vegeto-pestilence, diffused generally through the atmosphere, whose ravages have been favored by the sunless humidity of the last season, as the predisposing but not as the exciting cause. The proximate cause, again, in medical language, or the essence of the morbid state, is the fungus inmate of the tuber, from seminal impregnation of the stem, which so paralyzes the vitality of the plant that a portion of the starch and albumen becomes decomposed. This vegetable distemper, like that of the cholera, while general in its diffusion, is determined to particular localities and plants, by certain predisposing causes; yet it is independent of these, having occurred in many regions where such causes did not materially operate.

Whether it will recur, no human being can predict; meanwhile, it reads a great and solemn lesson to the rulers of states, never better expressed than in Virgil's well known verse:

"Discite justitiam moniti, et non temnere divos;"

which may be translated—"Beware of obstructing the free supply of food to your people."

Many preposterous prescriptions have been obtruded upon the public eye as to the best method of preserving the diseased potatoes from putrefaction. The above researches show the existence of a highly fermentable, saccha-

rine, and albuminous matter in them, which becomes rapidly operative by contact with air and moisture. Care should therefore be taken to keep their skins entire, so as to exclude the atmospheric oxygen and humidity. It is well known that the sugar in ripe grapes undergoes no change while the skin is entire; but the moment this is pricked, the grapes begin to ferment and speedily spoil. No plan is, therefore, more to be deprecated than that of slicing and mashing potatoes. They should be placed in an atmosphere kept by chemical means in a state of extreme dryness, which may be easily and cheaply effected by piling them upon a bed of brush-wood, dry turf, or straw, interspersing through the pile unslacked lime, coarsely bruised, and covering the pile thoroughly at the sides and on the top from the external elements. Since unslacked lime absorbs greedily one-third of its weight of moisture, it will bring the air in the spaces between the tubers into a perfectly arid state—a condition in which no decomposition of the substance can possibly take place. On the same principle, highly polished steel articles may be kept for any length of time without tarnishing in our humid climate, provided a basin with lumps of unslacked lime be enclosed in the case or chest containing them. Slacked lime, on the contrary, being saturated with water, has no power of dessication, but acts only, by its causticity, in favoring the destruction of all vegetable and animal matter.

Charlotte St., Bedford Square,
December 9, 1845.

PROFESSOR LIEBIG'S OPINION ON THE POTATO DISEASE.

The researches I have undertaken upon the sound and diseased potatoes of the present year have disclosed to me the remarkable fact that they contain in the sap a considerable quantity of vegetable casein, (cheese) precipitable by acids. This constituent I did not observe in my previous researches. It would thus appear that, from the influence of the weather, or, generally speaking, from atmospheric causes, a part of the vegetable albumen which prevails in the potato has become converted into vegetable casein. The great instability of this last substance is well known; hence the facility with which the potato containing it undergoes putrefaction. Any injury to health from the use of these potatoes is out of the question, and nowhere in Germany has such an effect been observed. In the diseased potato no *solanin* can be discovered. It may be of some use to call attention to the fact that diseased potatoes may easily, and at little expense, be preserved for a length of time, and afterwards employed in various ways, by cutting them into slices of about a quarter of an inch thick, and immersing them in water containing from two to three per cent. of sulphuric acid. After twenty-four or thirty-six hours, the acid liquor may be drawn off, and all remains of it washed away by steeping in successive portions of fresh water. Treated in this manner, the potatoes are easily dried. The pieces are white and of little weight, and can be ground to flour and baked into bread along with the flour of wheat. I think it probable that the diseased potatoes, after being sliced and kept for some time in contact with weak sulphuric acid, so as to be penetrated by the acid, may be preserved in that state in pits. But

further experiments are necessary to determine this. It is certain, however, that dilute sulphuric acid stops the progress of putrefaction.

GIESSEN, *November* 5.

From the Gardeners' Chronicle of November 15.

CAUSE OF POTATO FAILURE.

The cause of this disease appears to depend partly upon too great an amount of moisture, and partly on too copious a supply of manure to the soil: both induce too rapid a growth of the tubers, which renders the formation of a strong and durable cellular membrane impossible. Moreover, all the potatoes which have experienced the cell rot contain a much larger amount of aqueous constituents than the sound ones.

It may be expected that the disease of the tubers which are laid up for winter store will extend itself and finally destroy them, if care be not taken to preserve them in a dry place, whereby a portion of the excess of moisture may be removed. The author has found that the disease remains stationary when they are dried; at least, at the end of several weeks it had not attacked the neighboring parts.

PROFESSOR KUTZING.

From the Gardeners' Chronicle, November 29.

ROYAL AGRICULTURAL SOCIETY IN ENGLAND.

DECEMBER 9.—The first annual lecture was delivered this evening in the theatre of the Royal Institution, by Dr. Lyon Playfair. The subject was, the distemper in the potato. The lecturer commenced by making some general remarks on the history of the potato, and its cultivation in this and the other countries of Europe. He also exhibited diagrams of the structure of the potato, and tables of the chemical composition of the tuber in its healthy state. He then described the nature of the changes which took place in the potato under the influence of the disease. Much had been said and written with regard to the source of the disease; and since minute fungi were frequently found present in the decayed potato, the disease had been attributed to them as a cause. Some potatoes, apples, and other things had been inoculated with the sporules of the fungus, and these had become diseased. But if there were not some previous disease in the potato, how was it that some potatoes escaped whilst others were attacked? The disease he believed arose from physical or chemical causes. It was simply a decay of the tissue of the potato, arising from the union of the tissues of the potato with the oxygen of the atmosphere. When a decayed potato was examined, it was found that the diseased spots were always found in the region of the tissue called spiral vessels, whose function it was to carry air into the tissue of the potato. The reason why the cells entered into this decomposition so rapidly, arose from a constitutional weakness on the part of the cells of the tuber. This decay is rapidly spread from one cell to another, and the looser the tissue the more rapid the decay. By grating the tissue of some sound potatoes, and exposing it to the

atmosphere of the lecture room, it speedily assumed the color of the diseased potato. The cause of the constitutional weakness in the cells of the tuber was undoubtedly to be looked for in the weather.

A peculiar weather had been observed over the whole of the north of Europe, where the disease had been observed, as well as in America. The disease was no new thing, and appeared always when such weather occurred. At the time the plant commenced growing there was very warm and mild weather, and this was followed by cold and wet weather. The consequence was, the cellular tissue of the tuber contained more water than usual. In previous years, an analysis of the potato gave on an average 72 per cent. of water; by analyses which he had made this year of healthy potatoes, gave from 72 to 75 per cent. of water; whilst the analyses of diseased potatoes gave as much as 80 per cent. of water.

Other plants contained the same increase of water constituents, as turnips; and turnips were also affected with the same disease. Turnips were not so generally affected as potatoes, on account of their nitrogenous principles not being soluble, as those of the potato were. The disease, then, was a consumption of the potato, arising from the decay of its particles in combination with the oxygen of the atmosphere, produced by the state of the cellular tissue brought on by the weather. It arises from no degeneracy in the potato, and it need only to be feared from a repetition of the same circumstances. In the storing and preserving the potato, one great fact should be borne in mind; and that is, that the decaying particles were capable of communicating the decay to the sound tissue. Care, then, should be freely taken that they be freely ventilated, that they are kept dry and cool, and that there is absence of contact of the potatoes.

He defended the directions given by the Irish commissioners for the storing and preserving the potatoes as those best adapted for obtaining the object in view, in the community to which those directions were addressed. At the conclusion of the lecture, a vote of thanks to the lecturer was proposed by the Duke of Richmond, and seconded by P. Pusey, esq.

December 10.—Lord Portman in the chair. Dr. Playfair commenced by stating that the object of the lecture this evening would be to point out the mode of treating the potato for the future; and first, with regard to planting. He recommended that the potato should be planted *immediately*, for several reasons. First, because there might be little left for seed in the spring. Second, because potatoes planted now might be ready for use at the latter end of May, or the beginning of June. Where economy of seed was not necessary, he thought it would be better to plant the whole tuber of the potato, than to cut it. Where economy of seed was necessary, single buds or "eyes" of the potato might be removed and planted, the rest of the tuber being used for food. With regard to diseased potatoes, he recommended that they should not be used for seed where sound ones could be obtained; but where these could not be got, then he advised the planting of diseased potatoes rather than none at all. There was no prospect of obtaining sound potatoes from abroad for seed, and he had the permission of the late government authorities for stating that this was the result of their consular returns. If he were right in his views with regard to the nature of the potato disease, then no evil can arise from planting potatoes in the same soil in which they had become diseased. The fungus theorists objected to planting potatoes in the same soil; but he had shown their theory to have no foundation in facts. He would now consider how

the bad potatoes might be used, and quoted Bonjean's experiments to show that no injurious effect was produced on the system by eating them cooked; they might, when boiled, be safely given to animals, which would thrive on them. He described the various processes of procuring the starch which had been brought before the public, and pointed out the fact, that in procuring the starch only one of the alimentary secretions of the potato was obtained—that which assisted in keeping up the animal heat. The nitrogenous portion is thus lost. The plan he recommended, by which these last might be saved to a great extent, was to grate the potato, and pour water upon it till no more soluble matter was taken up: the remaining in soluble substance should then be dried, when it would be found an excellent meal with which to make soups, puddings, bread, and other articles of food. He did not apprehend a scarcity of food, but he wished to point out the fact that potatoes contained a very small portion of nutritious or nitrogenized matter; and, as this was the most important constituent of a working man's diet, he had drawn up a table of the comparative expense at which various articles of food might be obtained, which contained one pound of this nitrogenous matter:

25	pounds of	milk	contain one pound of	protein;	price 3*s*. 6*d*.
100	do	turnips	do	do	2*s*. 9*d*.
50	do	potatoes	do	do	2*s*. 1*d*.
50	do	carrots	do	do	2*s*. 1*d*.
4	do	flesh	do	do	2*s*. 2*d*.
9	do	oatmeal	do	do	1*s*. 1*d*.
7½	do	barleymeal	do	do	1*s*. 2*d*.
7½	do	bread	do	do	1*s*. 2*d*.
7½	do	flour	do	do	1*s*. 2*d*.
3½	do	peas	do	do	7*d*.
3½	do	beans	do	do	6½*d*.

He drew attention to the importance of cultivating the leguminosæ with such plants as the potato, on account of the large quantity of nitrogen they contain. In conclusion, he hoped the present blight would direct attention to the potatoes as an article of diet, and lead to a much less extensive dependence on them as food—a dependence of which they were unworthy; and, in the end, this dreaded visitation might prove a national blessing.

THE POTATO DISEASE IN FRANCE.

The extraordinary disease which has destroyed the potatoes in England has extended its ravages over Belgium and the north of France. In the latter there has been a complete panic on the subject, and, according to a statement in one of the Rouen journals, the mayor of one commune ordered that no travellers were to be supplied with potatoes. The Central Society of Horticulture for the department of the Seine Inferieure deputed a commission to visit the spots around Rouen where the potato is cultivated. Immense fields were found entirely destroyed. In all the neighboring districts the disease was found to be prevalent. In fields with a north or south aspect, having a good or bad situation, in all sorts of soils—stiff clayey, light sandy, deep, and shallow—the disease is the same. The only differ-

ence is, that the red potatoes are less affected by it than the others. The disease begins at the stalk : small black spots make their appearance ; they increase, and spread, and multiply, till in the end they cover the whole stalk. It begins on the surface, and soon sinks beneath it ; the vessels of the plant then take up the virus—it descends with the juices, and destroys the texture of the plant. The stalks dry and wither. The leaves die the last. The virus being carried to the tubers of the descending sap, small black spots appear in the middle of the potato ; they enlarge and spread. When the disease reaches the skin, the starch or pulp decomposes and becomes dry, hard, and black. The skin breaks ; decomposition is then complete, and the potato is rotten. It is supposed that the cold nights and the rain have caused this disease. The stalks look as if they had been frozen. The commission learnt that the peasants have given these diseased potatoes to their cattle without causing them any injury. The commissioners, therefore, had some of those which were just spotted boiled for themselves, and partook of them without inconvenience. The amount of the crop destroyed in the north of France is estimated at one-fifth of the whole.—*Rouen paper.*

The potato crops have failed in considerable portions of the provinces of Antwerp and Brabant. In Limburg and Luxemburg not a single locality has escaped the infection, but the light soils have less suffered. In western Flanders the greater portion of the crop is lost, and in eastern Flanders only one-fourth of the spring potatoes and nine-tenths of the less forward kind can be used. In Hainault the devastation has been very extensive ; and in all parts of the provinces of Liege and Namur the disease has raged more or less. In fact, it may be broadly asserted that the potato crops have all but universally failed here.—*Mark Lane Express.*

THE POTATO CROP ON THE CONTINENT.

Accounts from Stenay, on the Meuse, state that the disease with which the potato crops have been attacked in French Flanders and Belgium has extended to that country. The tubercles, the stalks of which are speckled, proved to be completely soft and full of water, and are unfit for food. The *Gazette*, of Metz, also announces that the contagion has affected several communes round Sarreguemines, in which the damage is greatest in the strong wet lands. Here the potatoes are so deleterious that they cannot be given with safety even to cattle. This scourge has fallen upon the districts of Sarrelouis and Leybach insomuch that petitions have been presented to the Prussian government for a suspension of all distillation from potatoes.—*Mark Lane Express.*

THE POTATO CROP IN DENMARK.

We have accounts from Copenhagen, which state that the disease in the potatoes is spreading more and more in Denmark, as in Funen, Lolland,

Falster, and likewise Sealand; especially in Amak, near Copenhagen. It has likewise appeared in the Duchy. It is stated that the disease is beginning to show itself in Sweden; and as the crops, particularly of the latter kinds, are more backward than in the Netherlands, it is feared that the disease may spread wider. It will, therefore, be advisable to take measures, in the discharging of cargoes from that country, to ascertain the quality of the potatoes.—*Dutch paper.*

THE POTATO DISEASE.

Paris Academy of Sciences: sitting of September 15.—Several communications were received relative to the disease which has this year manifested itself in the potato. The writers who treat on this subject, scientifically, are divided in opinion as to whether the disease is the result of the invasion of a parasitical mushroom, or solely attributable to the unfavorable nature of the season. One writer thinks that the parasitical invasion alluded to is common to the potato, and that it has been developed more extensively by the coldness and dampness of the summer. With due deference to the scientific gentlemen who have turned their attention to the visitation, we beg to observe that it is comparatively of little importance whether the disease have one origin or the other. The great questions to be considered, are, first, whether the diseased potato is, as people suppose, generally poisonous, or in any way injurious to health; secondly, whether, supposing this not to be the case, the disease has deprived the tubercle or its nutritive properties; and, thirdly, whether these diseased potatoes can be used as seed for the next year's crop. M. Philippon and M. Pouchet say that they have eaten potatoes in their diseased state, without suffering from them in any way. This is tranquillizing news; but these gentlemen do not tell us to what extent the potatoes which they ate were diseased, or whether, supposing that the diseased potato is not poisonous, it has not in its affected parts lost all its farinaceous character. We have examined diseased potatoes of the present year in all the stages of the disease, and have eaten some of those which were least infected—first, however, removing all the unsound parts with a knife—and certainly we did not experience any ill effects. This shows that the malady has only invaded such parts of the tubercle as give evidence of its existence; and there cannot be the least doubt that such parts as remain sound are fit foor food, whether for man or beast. As to the diseased parts, we have no hesitation in saying that they are wholly unfit for food, whether they be poisonous or not, for they can have no nutrition whatever. As to whether the diseased potatoes may be safely used as seed for the next crops, we do not think it requires much science to give an answer. If any part of the potato remain unsound it may germinate, and produce as good stock as that from a potato that is not diseased; and it is very improbable that the diseased portion should have the power of propagation, for it is a mass of putrid matter; but it remains to be seen whether the malady will not continue its ravages between this time and the period for planting, and so deprive the tubercle of all power of propagation.

REPORT OF THE COMMISSION OF AGRICULTURE OF THE PROVINCE OF GRONINGEN, ON THE DISEASE AFFECTING THE POTATO IN THE NETHERLANDS.

1. *Causes and nature of the disease.*

The agricultural commission is of opinion that the disease is not occasioned by any direct cause, but rather that various circumstances have combined to give the disease this year an extraordinary impulse, it being, in the opinion of many scientific persons, not a new scourge.

The primary cause may be attributed to the extremely wet summer of 1845, and to the heavy rains which fell at the moment of the formation of the tubers. It is probably owing to this circumstance that many plants did not germinate. In the second place, the commission is of opinion that the growers do not sufficiently attend to the preservation of the potatoes used as plants, so as to keep them from all damp. It is also very probable that the intense cold in the month of March much injured the tubers.

The more direct causes are probably as follows:

1. The too rapid development of the plants this year. It is well known that those plants which spring up too quickly, and the grain sown on an over-manured soil, are subject to such diseases as ergot for rye and other cereal grains, and rust for wheat, and the presence of cryptogamous plants.

2. The intense heat in the early part of the summer of 1845, and which amounted on the 13th June to 87° Fahrenheit, on the 3d July to 87½°, and on the 7th of July to 91½°, necessarily had the effect of drying up the ground excessively; and the rain which fell at intervals during the continuance of the hot weather, and was soaked in, had the effect of scorching, as it were, those plants and potatoes which, not being very deeply planted, were exposed to the action of the heated water.

3. This intense heat was succeeded by cold and rainy weather, which lasted from the 15th of July to the end of the month of August. This damp weather, and the total absence of the vivifying rays of the sun, caused a kind of rottenness among the pithy plants, and especially developed the cryptogamous plants.

4. On the 21st and 22d of July, an extraordinary fog was perceived in many places, which spread a disgusting smell. Soon afterwards, on the 28th of July, the first symptoms of the disease were discovered in the provinces of Groningen and North Brabant; and it is more than probable that this fog, which was epidemical, was intimately connected with the disease.

According to all the experiments and descriptions made of the disease, it appears that it commences on the upper part, and then attacks successively the leaf, the stalk, and the tuber. This is fully confirmed by an experiment made at Groningen. As it is the upper part of the stalk which is generally first attacked, it is probable that the disease originates in the leaves, descends the stalk by means of the peel, and then communicates with the part below the ground.

5. On the leaves spots have been perceived, and also a kind of fungus described in the work of MM. Maleschott and Baumhauer, and classed by M. de Martius among the *Fusisporium Solani*. These fungi are similar in every respect to those drawn by the above gentlemen.

It is very probable, then, that the above enumerated circumstances have been the simultaneous causes of the plant rotting, and of the fungi which

are observed thereon. It unfortunately happens that these fungi, which are extremely minute, are quickly propagated to an inconceivable extent, favored by the dampness of the atmosphere.

But the principal cause, or rather the character of the disease, is a kind of gangrene or mouldiness in the leaf, which occasions a very hurtful and even mortal decay to the plant. The dangerous influence of the cryptogamous plants has long since been shown by the example of the rust *(uredo rubigo)* in corn.

As soon as the rust spot developes itself on the leaf of the wheat or oak plant, it is observed that the leaf turns yellow, and withers at the spot where the rust shows itself.

No traces of the fungi have been found in the interior of the stalk or in the tuber. The commission, therefore, considers that the disease of these parts results from that of the leaf.

It is very probable that the disease has long existed in this country, but it has never hitherto sufficiently developed itself to attract serious attention. Having been fed for two years by a moist temperature, it has increased this year to a frightful extent, and become a real calamity. The commission is, however, of opinion that the disease, as now known to us, has never been treated of by naturalists. At any rate, it is far from resembling the cancer described by De Martius, or the scurf of potatoes, as these two diseases arise in the tuber, and not in the leaves.

2. *Remedies for the disease.*

The disease itself, its character, and causes, having now been sufficiently considered, it is necessary to consider the remedies for the disease, of which the commission points out three different kinds:

I. A means which, unfortunately, it is not in our power to adopt at pleasure—that is, a drier atmosphere; for if it be damp that has caused the mouldiness of the leaves, and has propagated it among the plants, it follows that dry weather would put a stop to the ravages of the disease, and even result in entirely destroying it.

This observation applies to the measures which science may propose, now that the disease has probably reached its period.

II. To prevent the return of the disease, it is necessary to take the following precautions:

1. To leave the potatoes in the ground until very dry weather occurs. Experiments having shown that their decay is accelerated by being taken up, it is advisable to leave them in the ground at first, in order to get dried, and afterwards to lay them out over the field. This would have the double advantage of rendering the vegetable more whole some, and of preserving it.

2. The following applies especially to those potatoes to be used as seed for next year. It is necessary to beware of planting those plants which have been attacked by the disease. They must be carefully chosen from those whose stalks have not been attacked, and placed in a situation free from the slightest damp. As the disease has been less severe in gravelly than in clayey soils, the tubers should be chosen from those gravelly soils where the disease has not penetrated.

3. The withered leaves of diseased potatoes, which are of no value,

should be immediately burnt; the same should be done with the rotten potatoes, which cannot be of any use. Nothing should remain of them.

4. It is necessary to avoid as much as possible planting potatoes in the same spots where they have been planted this year, for it is most probable that seeds of the fungi have remained in these places, and there would be great risk of the ensuing crop being similarly attacked. It is also necessary to manure the land with lime after the potatoes have been taken up, and then to clear it; and if the land be employed for produce which need not be planted before winter, it is better not to harrow it, and so allow the air and cold to penetrate it. In the spring the lime manure should be renewed as much as possible, and the land may be watered with diluted sulphuric acid, one part of sulphur to 100 of water.

5. Next year the potatoes should be planted in dry land; all damp places should be avoided, even places shaded by houses or trees. It is once more repeated that great care should be used in selecting the tubers, and they should be planted at a little distance from each other, so that the earth round each plant may be raised, that the air may penetrate everywhere.

6. The commission does not agree with those naturalists who think that the origin of the disease may be attributed to the race of potatoes having gradually deteriorated, owing to their being seldom reproduced in fresh soil. The report mentions that in the commune of the Marum, (province of Groningen,) among other instances is to be seen a field of potatoes, the produce of only three years' culture, equally attacked by the disease; and an infinite number of similar cases prove incontestably that the potato has not degenerated. However, the commission recommends that fresh seed should be employed this year; for it will then, at any rate, be certain that it has not been attacked by this scourge.

III. If, notwithstanding every effort, the disease should again break out next year, the moment the first symptoms of it are perceived, the first leaves that turn yellow should be taken off and burnt, or the entire field should be watered towards evening with lime water, or, still better, with diluted sulphuric acid, so as to destroy the seeds of the cryptogamous fungi: sulphuric acid, moreover, prevents rotting, and, when prepared as above directed, can do no injury to the plants themselves.

3. *Use to be made of the diseased potatoes.*

Those potatoes which have been attacked by the disease appear not to be prejudicial to health, when taken in moderate quantities. The commission has consulted veterinary surgeons as to whether the potatoes can be employed, without danger, to feed cattle. Their reply was in the affirmative. It has been proved, moreover, that pigs have eaten the diseased potatoes without death ensuing. The commission is, however, of opinion that they should be cooked beforehand.

Man may likewise make use of the diseased potatoes, but must carefully remove the brown spots which caused the disease. It has also been shown, by experiments, that potatoes which have remained untainted on the same plant where there are spoiled tubers may be eaten without hesitation. It is almost useless to remark that potatoes which are completely rotten are hurtful not only to man but to cattle, and too frequent use of spoiled potatoes is equally dangerous to those who make their sole food of them. Dr. Westerhoff remarked, that in the commune of Warffum (province of Gronin-

gen) those persons who made use of spoiled potatoes experienced pains in the stomach, and nausea, followed by vomiting, after eating them.

It has also been perceived that sheep have been made severely ill by eating attacked potatoes, though they were soon cured by a change of food.

As to the means to be employed to prevent the baneful influence that my be exerted on the health of man by eating the diseased potatoes, the commission proposes to make this the subject of another inquiry. In the mean time, it advises that as much use as possible should be made of the fecula of potatoes.

From the London Gardeners' Chronicle, Nov. 29.

POTATO DISEASE IN BAVARIA.

This is fortunately not very common in our part of the continent. I do not think we have yet lost more than the tenth or twelfth of the crop. It is everywhere more observed in wet, heavy land, than in such as is dry and sandy, or chalky.

It is distinguished from the disease that attacked us in 1842, by the rapidity with which the infected potatoes run into a state of putrefaction, by the absence of any evident fungus spawn or mycelium, and by the obliteration of the membrane of the cells before any diseased action is visible in the starch grains. I am perfectly satisfied that it is the extraordinary season, combined with the negligence of our cultivators, and their bad treatment of the plant, that have caused us to be visited with this calamity. I cannot believe that any parasitical fungus has produced any such mischief. This year the parasite *aecidium columnare* has done great mischief to the spruce fir trees on our Alps. The trees have been much weakened by the loss of the leaves of 1844 and 1845, which were loaded with the parasite; but leaves of a greater age have not been touched. The young leaves had assumed a dull yellow color before they were attacked, and this disease, which was the precursor of the fungus, was no doubt caused by the long duration of an extraordinary lodgement of snow during the past winter, and by sudden changes of temperature (as much as from 30° to 5° R. in three days) during the summer. "*Je n'aime pas à vou des revenants dans la nature.*"

ZUCCARINI.

MUNICH.

POTATOES FROM SEED.

[Made public by order of the Minister of the Interior.]

The disease in potatoes, which has this year appeared in many parts, has rendered it necessary to raise them from seed; but as the old method required several years to produce tubers of a sufficient size, it is little practised.

Zauder, Count Arnim's gardener, at Boitzenburg, (in Mecklenburg,) has succeeded in producing a good crop of potatoes from seed the same year it

was sown, and as large as those from sets, and those seedling potatoes are entirely free from disease. His plan is as follows: He gathers the apples before the frost sets in, (according to others, a slight frost does not injure them,) and keeps them in a dry place till the end of January. The apples are then crushed with the hand into a vessel, where they lie from six to eight days to rot, that the seeds may be easily separated from the pulp. Water is then poured on, and the seed is washed and dried like cucumber seed, and put away in a dry place. At the end of March, or beginning of April, the seed is sown in a hot-bed, and treated much the same as other culinary plants. If there is a convenient place for a hot-bed near a wall or house, exposed to the sun, glass is not necessary. The plants may be treated like tuberous plants; but as they are very susceptible of frost at night, they should be covered with straw or boards, which can easily be done, as the bed is surrounded with boards set in the ground, upon which the covering can be laid without injuring the plants. In May, if the plants are well grown, they can be planted out in a light soil about the usual distance that sets are planted. Zauder this year sowed early potato seed on the 11th April, and planted them out on the 26th May; and here we may remark that vegetation is 14 days later in Boitzenburg than in Berlin.

The plants produced from 1 to 1½ gallon (metzen) of tubers. One plant even produced 280 tubers. There were of course a great many small tubers among them, yet the produce of large ones was, on the whole, equal to the produce from sets. As Zauder has followed this plan for five years, he was able this year to give seed to several gentlemens' gardeners and laborers. The potatoes raised by them have all been healthy, while the disease was everywhere, and even in the neighborhood. The result of this experiment deserves to be widely spread, that the people may still preserve the apples for next year. The space of half a square rood of land (7 feet) is sufficient to raise enough to plant one acre, so that it will be useful for small farmers who plant just enough for themselves.—*Preussische Zeitung.*

From the New York Farmer and Mechanic.

The following communication was read before the last meeting of the Farmers' Club, and communicated to the Farmer and Mechanic:

AN ESSAY ON THE WET AND DRY ROT IN POTATOES.

BY FRANCIS AUGUSTUS PINCKERT WEIMER.

The crops of potatoes in mountainous districts are found to be invariably of better quality, and larger in quantity, than those raised elsewhere.

In former years only single potatoes have rotted here and there; still it is only within the last few years that the malignant and destructive potato rot has commenced.

Extent of this disease.—In Bohemia, believed to proceed from insects; in Saxony, in Russia, especially in Pomerania, Silesia, Westphalia, and Rhenish Prussia, in the mountainous country of the Lower Rhine, loss of half the crops.

In Arnsburg, in 1840, potatoes cut and planted rotted in the ground. In 1839, *whole* ones did not germinate. The rot not owing to dry weather.

In Bavaria potatoes rot sooner than they did six years ago. Those from the other side of the Rhine being planted, they were no better. In Austria and Prussia, particularly in Gera, this disease exists. In some fields not half of those planted germinated. In the midst of all these, we were delighted to see the fields of *Von Meutzch*, with fine luxuriant crops of potoes, owing to the rational mode of cultivation.

Many tenants who had raised several hundred pecks of potatoes now had but twenty or thirty pecks.

In Hesse and Nassau, Mechlenburg and Anhalt, the crops of 1842 were very diseased.

In 1780 and 1782 there was a potato disease, but only of the stems and leaves.

In England and France the disease is complained of greatly.

In Denmark, in Sweden, and in Norway, it is found.

In the Russian provinces on the Baltic it appeared in 1843, and the seed potatoes procured from a distance suffered as well as the native seed.

This disease shows itself by perfectly obliterating the whole internal organic structure of the potato plant. It is of two kinds—the *wet* and the *dry* rot.

Professor Kohlert, of Prague, terms the dry rot a *cold combustion*. They have white spots on them called combustion spots.

In Nassau, the potatoes, after digging, show on their outsides brownish red spots. After being in the cellar some time, they become spongy, cavities commence in them, and a very bad smell.

In Saxony, they say the spots were black, and they term them corruption spots.

Kleeman says the dry rot does not always affect all the potatoes in the same field at the same time, or same extent; that the eyes are first affected. In 1841 he first observed numerous brown or black spots on them, called *stagnation* spots.

Kohlert says the wet rot causes the potato to become spongy, moist; and, being compressed, resemble rotten cheese, and also have a putrefying smell; and such ones infect sound potatoes in contact with them.

In Thuringia, potatoes had the wet rot. Formerly they had been injured much by worms. A field which had never before been planted with potatoes showed the same disease.

DISEASE OF THE POTATO.

[Translated by H. Meigs, esq., Secretary of the New York Farmers' Club, from the Annales de la Societé Royale d'Horticulture de Paris, November, 1845.]

Note by M. Payen on the special affection of potatoes in 1845:

Progress of the disease.—This special affection of the potatoes has extended from Germany to Belgium and to Great Britain, and afterwards to France, where it has spread by degrees in the departments of the north, northwest, centre, south and east, moving step by step, attacking all varieties of soil, situation, exposure—sparing here and there spaces of more or less extent, or circumscribed in the midst of diseased fields.

In the midst of this confusion, we have generally remarked varieties of

potatoes ripening very rapidly, some later escaping the evil. Dry, sandy, sloping soils, open to the south, may be little or not at all diseased.

Causes.—All observers agree in acknowledging the influence of extraordinary weather: cold in a very wet summer—intervals of great heat and storm.

The luxuriant growth of the potato stalks promised a great crop; but the tissues having pores thus widely opened, distended with the wet which the plant could not exhale, were easily dislocated by sudden cold, and more generally in this condition they received the germs of the cryptogamid, whose sporules penetrated through the conduits of the stalks, so full of liquid, to the tubers. We conclude that the disease consists in the development of cryptogamous vegetation from sporules, introduced into the potato through the stalks. This parasite vegetation often attacks only those potatoes nearest to the bottom of the stalk, sparing almost always those potatoes which are second or third in growth on the roots of the plant.

This cryptogamous vegetation and the diseased potatoes are then attacked by various insects, which have been carefully observed and described by Messrs. Rayer and Guerin Meneville. Putrefaction then fills the tissues with fungus, and, besides, they are attacked by myriads of microscopic animalculæ, which, in their turn, decay and add their ruins to the putrefaction.

One rational mode of preventing this disease would be to burn the potato stalks, so that we may destroy as many of the sporules as possible. But many would still escape. Better seasons than our last may doubtless suspend or diminish this evil. We ought to plant our crops of potatoes as far as possible from the fields where they were diseased.

We ought to plant them on dry, sloping lands, rather than wet and low grounds. We ought to plant such potatoes as ripen early. We ought to plant all the varieties of potatoes from fields not yet diseased. Lime the potatoes for planting, and give the soil some lime. Watch the growth of the potato stalks, and as soon as they show signs of disease cut off the stalks, take them away, and burn them. When the potatoes are approaching maturity, watch the leaves, and take off such as show disease. Whitewash with quick-lime (one part lime to twenty parts boiling water) the walls of the cellar where you store the potatoes.

Lastly, to renew from the seed the variety of potatoes offers the best chance for the amelioration of our potatoes.

Note by M. Mounier, of Bourg.—In the department of Ain, potatoes were not diseased, but they showed a precocious and unusual maturity—some three weeks earlier than common. We hoped a great crop (about the last of July;) but all this anticipated maturity paralyzed the growth of the potatoes, so that, although one crop was good as to the quality, yet the potatoes were small and few in number.

From the Farmers' Cabinet, February, 1845.

DISEASE IN THE POTATO.

A committee was ordered, by the Philadelphia Agricultural Society, some time since, to collect facts and materials for a report on the disease of the potato now prevailing. As a part of their action, the following translation was made, at their desire, of a paper on the subject, by Professor Von Mar-

tius, one of the most celebrated scientific men of Europe; and they now publish it as a part of the report that they intend making at some future time.

The potato epidemic of last year, or the rot and scab of the potato, described by Dr. C. F. Ph. Von Martius: Munich, 1842.

Certain diseases of the potato plant have been observed for more than eighty years.

Curl.—The *curl* has been observed in 1776–'79, in the principality of Goettingen, and was described first in 1779. The so called white table potato was almost the only sort attacked at first. In 1780–'90, the disease appeared frequently on the British Isles, where it is said to have been first observed in Ireland, whence it spread over England and Scotland. John Holt mentions two other diseases, as having appeared contemporaneously with the curl, viz: the cancer, which appeared, according to him, chiefly in wet seasons; and the scab, which appeared to be produced by dry seasons.

In Hanover, the curl was first observed by Thaer, in 1790, and in the beginning of this century it showed itself most destructively in Southern Prussia, since which time it has shown itself at different places in Germany; nowhere, however, to any great extent. Putsche, a monographer of the potato, gives the following description of the curl: The plants attacked by it look very poor; stem of a brownish green, or of a variegated color, with rubiginous spots, penetrating into its pith; leaves rough, wrinkled, curled, shrunk, with short petioles, covered with spots—some of a light green, others of a yellowish green color. The pith of the sick plants is often found rust-eaten, as it were, and parched. Early in the fall the plants turn yellow and perish. The few tubers found are of a bad flavor, soapy, and hardly eatable; leaving, when eaten, a feeling of scratching in the throat. The very skin of the tubers is different from that of the sound ones; its color being partly brown, partly of a pale yellow, or often with both colors blended.

Experience has shown that certain varieties of potatoes are more liable to this disease than others; that they are less exposed to it on mountains than in the level country; that the round and oblong red varieties are more readily attacked by it than the white ones; and that this disease is propagated by the seed-potatoes, and does not disappear before the fourth or fifth generation, even when the plants are well taken care of.

Rust.—Another disease, which is mentioned as occurring contemporaneously with the curl, is compared by Putsche with the *rust* of the grain. According to his description, small rubiginous spots appear on the leaves of the sick potato plants, and, spreading gradually further, cover finally the whole surface of the leaves. The perspiration of the leaves being impeded, the stems become parched and wither; or, where this latter does not take place, black nobs are developed in the tubers, which are harder and more stringy than the rest of their substance. The causes of this disease are unknown; it is often but of short duration, and is cured by a gentle rain.

Mr. Hampe mentions a disease of the potato under the same name of rust, where the tubers show spots of the colors of the rust, with excoriations here and there. This disease occurred in cold, wet summers, when fresh dung had been brought upon the soil.

Blue pox.—Another disease, called *blue pox*, or *blue tumor*, not yet ob-

served by Mr. Martius himself, has appeared in several parts of the kingdom of Saxony, and in the Upper Harz. According to Mr. Hampe's description, blue spots and risings are first observed on the skin of the tubers; afterwards a dark colored texture, similar to a rhizomorpha, (probably the forerunner of a mushroom,) appears, which surrounds the tuber, penetrating even its interior, followed by blue spots and streaks in the heart of its substance.

It is said to be produced by an improper admixture of sawdust and pine-straw, and other imperfectly decomposed organic substances, with the dung. Very wet weather causes, then, the final outbreak of the disease.

Rot.—The disease which has lately committed so great ravages in the potato crops seems to be the same that was described first in 1769, by Gleditsch, and may be called the *rot*. In Germany it has been called "rot of the stem," "fruit cancer," "rot, or gangrene of the tuber." This same disease seems to have prevailed in the Saxon Voigtland, in 1783, when the summer was very hot and very foggy. It was described in 1784, by Dr. Ackermann. In the present century it began to show itself first epidemically in 1830, in France and Germany—in the latter country, in Rhenish Bavaria, Northern Bohemia, Saxon Mountains, Erfurt, Anhalt, Silesia and Meklenburg—and continued increasing in intensity, and spreading more and more, until it reached its height in 1840.

The *rot* may be designated by the dry and the moist rot, according to the degree of moisture either contained in the tuber, or acting from without upon it. Symptoms of this disease are—the potatoes brought home to the cellar, and the seed potatoes when laid on the field, get rapidly rotten; and the latter either rot before the leaves have sprouted, or they produce but small and scanty lateral tubers, closely attached to the seed potatoes, of the size of musket-bullets, which produce but very slender stems, or the plants that are grown from them are but meagre and soon droop and wither. At any rate, but few small and weak tubers are produced. These, when but little exposed to moisture, appear dry and hard, of a consistency like that of truffles, and unable to produce any eyes; when brought into the ground, they soon rot by attracting the moisture from the ground. Fields that suffer much from this disease look like stubble fields, where potatoes, left here and there, from last harvest, have sprouted. The flowers show themselves very unequally on such plants, and but very seldom produce fruit.

The rot seems to have appeared principally in those parts of Germany where a denser and more industrious population cultivate the potato in a more rational, but also more refined way, and chiefly where they raise their potatoes not by laying whole tubers, but by cutting these into several slices.

Too great economy in planting the potato seems, therefore, to have an essential influence on producing this epidemical disease. The two forms of mushrooms that are observed most frequently in potatoes attacked by the rot, are set by Martius under the genus *Fusisporium*, and are called by him *Fsp. Solani*, and *Fsp. sporotrichoides.*

Chemical analysis.—Dr. Andr. Buchner, jr., found, on a chemical analysis of potatoes infected with the rot, which he made at the request of Dr. Martius, that no new substance had been formed in them; they contained a considerable quantity of amylum in cases where the moist rot had not shown itself, but only the dry one—and its quality was not altered, but the albumen had disappeared entirely; and the quantity of water, of

which the sound potatoes contained 73.6 per cent., had been reduced in the diseased ones to less than the half; i. e., to 35.6 per cent. The fibrin in them was of a brownish color, and in part already mouldy.

Scab.—There appears often at the same time with the rot, another disease, less injurious, called the *scab*, which occurs, however, also sporadically, from a great variety of external causes. As far as it is known to Martius, the scab produces but very rarely an entire alteration of the substance of the seed potatoes. It is distinguished from the rot by its being merely a corruption of the cellular tissue, that lies immediately under the epidermis, followed by the generation of a mushroom, called by him *Protomyces tuberum Solani*, and by the destruction of the epidermis. The rot, on the contrary, infects the entire substance of the potato, and is an induration and a mouldiness of the tuber. Sometimes, also, the tuber that are attacked by the scab pass into a state of putrefaction, or produce but feeble stems, with fewer tubers, yet far less frequently than those attacked by the rot. Dr. Martius has not been able to determine whether the scab and the rot occur together on one and the same field, or even on one and the same plant.

Causes of the rot.—There are both external and internal causes of the rot, of which the former regard, first, the preparation of the seed potatoes for laying, and the soil wherein to plant them; second, the state of the weather; and, third, insects wounding the plants. The internal or predisposing causes regard, first, the peculiarities of the different sorts of potatoes; second, the manner of treating the plant on the field, and of treating the seed potatoes from harvest time to the time of planting them; and, third, the way of laying the tubers, and of treating the plant till its maturity.

Soil.—The chemical composition and the degree of density of the soil seem to have the greatest influence on the growth of the potato. In its native country, in Peru and Chili, it grows in cold mountain regions, and in a stony soil, that is rich in loam, but sufficiently loose. In Europe the sandy soil has been found the most convenient. The rot has been observed, however, on all kinds of soil, comparatively speaking; however, less frequently on a light, sandy, loose soil, rich in mould, than on a hard and heavy one. The scab of the potato, on the other hand, has been observed principally on lime soil. It is not so much, however, the original quality of the soil, as the particular way of preparing it, which seems to influence the rot, since it has been observed even on fields that were manured carefully, at the right time and with old dung, whilst other fields, badly cultivated or not manured at all, remained free from it, and yielded even good crops.

Manure.—Most injurious seems to be the bringing the seed potatoes in immediate contact with the dung. Manure is best applied before the beginning of the winter season. Dung that is too fresh and too hot is in general injurious.

Moisture.—With regard to moisture, stationary wetness is undoubtedly injurious. In its native country the potato is found thriving in a dry soil, which at certain seasons is strongly penetrated by moisture.

A rotation of crops appropriate to the locality has been observed to be favorable to the productiveness of the potato.

Weather.—With regard to the weather, as an external cause of the rot, we may conclude from all the reports that have come in, that most parts of Germany that have been ravaged by this epidemic have rather suffered by too great dryness, than by too great moisture. A long continuance of dry weather in spring proved very injurious to the sprouting of the seed pota-

toes in the Palatinate. On the lower Rhine, on the contrary, wetness was found to favor the breaking out of the rot; the same has been the case in the Harz mountains, and in Bohemia.

A very singular fact, observed in several villages of the Palatinate, was that of potatoes, taken from one and the same cellar; all those laid in the morning sprouted, while all those laid in the afternoon failed.

Martius is opposed to the opinion of those who seek the cause of the rot in insects laying their eggs on the potatoes, as but very rarely any eggs have been found on them. He is, on the other hand, not disinclined to side with those agriculturists who believe that two different sorts of potatoes of very different degress of acclimation being planted aside of each other, the one less acclimated will exert an injurious influence upon the other. In the year 1781, already several farmers ascribed the cause of the curl to the cultivation of the lately introduced *large American* or *New England hog potato*, the same probably as the *English cluster*, or perhaps also to that of the kindred *Howard*, or *large cattle potato*, in the neighborhood of the *red potato* then generally cultivated.

Internal causes.—Martius has observed the rot attacking only the late sorts. In the Palatinate, the *gelbe* and *weisse Speise-Kartoffel*, i. e. yellow and white table potato; and among these, more those of a softer and proportionally more juicy texture were chiefly attacked. In Saxony, Meklenburg, and elsewhere, again, all sorts were attacked indifferently.

Points to be observed in the cultivation of the potato.—In cultivating the potato, we have to attend to the following points, when we wish to obtain a healthy crop.

1st. The seed potatoes are to be raised separately from those destined for food, since the growth of the eyes in the tubers takes place at the expense of the amylum contained in them. In gathering and bringing home the potatoes, they ought to be guarded from all unnecessary concussions.

2d. In preserving them in cellars, they are to be kept from freezing, but so as not to prevent a free draught of air, since they begin to perspire soon after being brought in, chiefly in confined places, and continue to do so for four to six weeks; which perspiration, when not allowed to evaporate, occasions their decomposition.

3d. Those tubers will prove the best for raising vigorous plants whose eyes are yet quite short, but juicy, and where the tubers have just begun to spend a part of their nutritive matter in the formation of the eyes, which is recognised by a slight withering of them.

4th. Great care is necessary in propagating the potato by cuttings, as those whose eyes were wounded have been found particularly liable to the rot. Chiefly the upper part of the tuber, lying opposite to its point of connexion with the plant, and having the greatest number of eyes, ought to be used for planting. The cuttings ought to be kept for eight days at a moderately warm place before planting them, or to be strewn with wood-ashes or gypsum on the cut surface, in order to make them less accessible to the moisture of the soil.

5th. In laying the cuttings, care must be had to lay them with their eyes upwards. When, instead of entire tubers, cuttings only are laid, it is important whether the earth around them lies loosely or closely, and in what manner the ploughing is done. The rot has been in general less frequently observed where, instead of the plough, the spade is used. With regard to

the manure, Martius thinks it is best to cover the cuttings with earth, and then first to spread the dung over them in the furrows.

In the ore mountains of Saxony, the farmers have improved their potato crops in quantity, as well as in quality, by laying whole tubers, instead of cuttings, and preparing for every one of them a couch, as it were, of a handful of dried leaves, or of chopped straw, and covering them afterwards with earth.

6th. It is necessary to heap up the earth around the stem of the potato plants, and it will depend on the quality of the soil, and the sort of potato used, to what height that is to be done.

7th. It is injurious to the growth of the tubers to cut off the leaves and to pluck off the flowers; the later the season is at which the leaves are out, the more the future crop is diminished, as the plant will spend part of the substance accumulated in the tuber in forming new sprouts.

Rot a contagious epidemic.—Martius considers the rot of the potato as an epidemical disease, being contagious under certain dispositions, and having its seat in the tuber, in which it produces a peculiar decomposition and destruction of its form, which, at a certain stage of the disease, renders it unfit for self-preservation and propagation, and terminates with the production of a peculiar mushroom—*Fusisporium Solani.* Martius ascribes to the seed grains, or *sporules* of the latter, the capacity of infecting other tubers already predisposed to this disease, so as to produce in them the rot.

Fries, in his *Systema Micologicum*, and Unger, think the rot, as well as the ergot in the grain, to be produced by cosmic causes, and not to be contagious at all. Sinclair, Link, and De Candolle, on the other hand, think it contagious, and the last mentioned scholar believes that the seed grains of the smut (*uredo*) come always from below, out of the ground, in which they lie in great numbers, into the plants which inhale them, together with the water through their radicles. This opinion corresponds with the previous observations of Knight, Tillet, and Tessier.

The *smut* can then only develope itself when a diseased mixture of the juices has been prepared by unfavorable terrestrial and cosmical relations; as too fresh manure, sudden changes from cold to heat; or, *vice versa*, great wetness, too early harvesting.

Experiments have been made concerning the contagiousness of the *Fusisporium Solani.* When its seed grains were sown upon slices of both diseased and healthy potatoes, the mushrooms developed themselves very rapidly within three weeks. When they were sown on the outside of a healthy thin-skinned potato, its epidermis became diseased, which might be seen by numerous round dry spots of one twenty-fourth of an inch in diameter, and of a darker color.

Preventive remedies.—Martius does not expect to see the rot cease entirely. In order to prevent contagion, the ground of places where infected potatoes have been kept is to be strewn with pure dry sand or ashes, and in cases of strong infection, straw might be burned in the cellar, or the walls be whitewashed. The diseased potatoes themselves are not to be thrown upon the dunghill, but into the water, or to be buried. Seed potatoes that come from fields infected with the rot, before laying them, are to be slightly moistened, to be strewn with powdered lime and ashes, and to be turned with a shovel. Tubers that have not sprouted may be laid for some hours in lime water.

The only remedy against the seed grains of the mushroom buried in the

ground, is to raise in such a field, as long as possible, other fruits, and, when about to raise again potatoes in it, to mix the soil with gypsum, loam, lime, &c. *Preservatives* are: to select, for raising, some good sort; to separate the seed potatoes, from the very first, from those destined for food; to sort the potatoes according to their size; to reject those apparently healthy, that show discolored roundish tumors.

To secure the potatoes in the cellar from rot and scab, the cellar ought to be dry, and, if possible, laid out with dry boards, and ought to have a sufficient draught of air; the floor to be strewn, besides, to the depth of some inches with sand mixed with ashes, coal dust, or fine iron filings. The potatoes ought to be well dried before laying them upon this, in heaps of more than four feet high. Horizontal poles ought to be stuck in, with dry brushwood round, to draw off the vapors arising from them, and the potatoes to be laid upon the poles.

Extracted and translated by

HENRY SCHOLL.

ON THE DISEASES OF POTATOES.

Extracted principally from Die Kartoffel.—Epidemic.—Dr. Von Martius, Munich, 1842.

From the Gardeners' Chronicle and Agricultural Gazette, Sept. 13 and 27, 1845.

It is not a matter of surprise that a plant cultivated under such various circumstances as potatoes should be subject to various diseases. Some of these have been more or less imperfectly described in the older agricultural works; but in the absence of all minute details, it is almost impossible to ascertain precisely what is meant. Indeed, before the improvements which have been made in microscopes within the last 10 or 15 years, it was scarcely possible to enter into some points in the diseases of plants, which are now comparatively easy.

The principal diseases which have been noticed in potatoes are the curl, the rust, the blue pock, the scab, and the dry rot. The disease of the present year is different from all of them. The three first have not at present been sufficiently observed. For an admirable account of the two latter, we are indebted to the zeal of the Bavarian government, and the scientific researches of Dr. Martius.

The *curl* is described in the "Hanover Magazine," page 1779, as follows: "Soon after their first appearance the shoots become curled, and make but little progress afterwards; sometimes, indeed, they disappear altogether. Some, however, remain nearly stationary, either not producing blossoms at all, or only very weak ones, which soon fall off and yield no seed. They produce no tubers, or only a few minute ones, which are strong and unfit for food. These, however, when set, do not always produce plants infected with the disease. It is said that at the base of the shoots, where they spring from the set, there is a hole, which the author attributes to the agency of some insect.

This disease was extremely prevalent in England towards the end of the eighteenth century, and prizes were offered for the discovery of some means of arresting its progress. It is probable, from some of the descrip-

tions that were published, that it was accompanied in some cases by rust and scab; but in what degree the diseases are connected, it is at present impossible to say.

Various causes were assigned by those who first observed it. At present, the more general opinion is, that it arises from the use of over-ripe tubers. A fuller description is given of the disease in the "Monograph of Potatoes," published by Putsche and Vertuch, at Weimar, in 1819.

The plants which are affected by this disease have an extremely meagre appearance. The stem is unbranched, brownish green, or mottled, and here and there sprinkled with rusty spots, which penetrate to the pith, so that it is not white but rust colored, or sometimes black. The upper surface of the leaves is not so smooth as usual, but rough, wrinkled, curled, or crumpled.

The leaves are far more sessile than usual, and are not of a uniform brownish or dark green, but spotted. The passages for circulation, imbibition, and respiration, are none of them in a healthy state. The pith is often discolored, or dried even in the young shoots. The starved plant often perishes early in autumn, when the tubers should be making the most rapid growth. These are scanty and tasteless, juicy, and almost unfit for food.

Even the color of the outer coat of the tubers is changed. The same tuber is in parts brown, in parts of a dirty yellow, and sometimes the two tints run into each other. Some sorts of potatoes are more subject to the disease than others. It is more prevalent in flat countries than in more elevated districts.

The second disease mentioned by Martius is rust; which, however, as is in the case of the curl, he has not himself had an opportunity of observing.

It is described in the Monograph, quoted as above, as allied to the rust of wheat. Rust colored spots appear upon the leaves, which are at first small, but gradually increase, and at length overrun the whole leaf. As the respiration of the leaves is in consequence impeded, the stems are thin, and at last wither. When, however, this does not take place, the flesh of the tubers is infested with black knots, which resemble ulcers, and are harder and more fibrous than the rest of the flesh. The cause of this disease is unknown. It is often only of short duration, and is ameliorated by mild rains, so that the produce is not much affected.

The nature of this disease is evidently very obscure. It is probably the same with that mentioned by Standinger, in the Isis of 1832, as occurring at Altona, in land highly manured with herrings. The peasants about Hamburg and Altona attributed the rust in wheat to the introduction of potatoes. Holland had the monopoly of potatoes, and supplied Hamburg, but at length they depended on a home supply; and potatoes being largely cultivated on highly manured land, in consequence of a rise in the price of wheat, they believe that their wheat became infected with rust.

There is great doubt as to its being really allied to the disease in corn which bears the same name.

The third disease is the *blue pock.* Martius has not himself observed it. Hampe describes it as first appearing under the form of blue spots, and elevations on the skin of the tubers. At a later period, dark rhizo-morpha-like threads (probably the mycelium of a fungus) invest the tubers, or even penetrate their substance. Blue spots and stripes at length appear in the flesh of the tubers, which are not eatable. It is said that it arises in very

wet weather from undecomposed matter, such as sawdust, (which in the infected districts is used extensively for floors, instead of stand,) being mixed with the dung.

The disease, to the examination of which the greater part of Martius's book is dedicated, (the dry rot,) makes its appearance on the tubers after they are stored in the pit or cellar, and when, in early summer, the sets are committed to the ground. In the latter case they perish before they have thrown out any shoots, or merely produce one or two minute tubers, which either do not produce shoots at all, or only such as are extremely weak and soon perish. If there is little moisture, the tubers become hard and dry; and as soon as the soil becomes wet, the greater part perish, so that the fields appear like fallow lands sprinkled with a few stray potatoes of the last year's crop. The disease is often accompanied by scab; which, however, is not so universally diffused through the infected districts as the dry rot, but is sporadic in its appearance, while the dry rot is a complete epidemic.

It was first observed in 1830; but it had increased in the year 1840 in various parts of Germany to such an extent as to cause very serious alarm, and even to threaten the total extinction, for a time, of the cultivation of potatoes. The potato pits, when opened, exhibited a greater or less degree of corruption, three parts out of four occasionally having become altogether useless; and of the residue, when planted, the greater part often failed entirely.

In the early stages of the disease, the use of the tubers was not found to be injurious to man or cattle. In the latter stages of growth, however, the decay is such as to make it quite impossible to use them.

The disease is very insidious in its progress. When the crop is harvested, there is little to attract the superficial eye. The surface of the tubers is rather dull and wrinkled, and then gradually exhibits little round, brownish spots, which soon become confluent. The surface then appears more than usually cracked and reticulated, and at length scaly, the edges of the scales being free.

Sometimes, however, the tubers become transversely wrinkled, in which case their color remains nearly the same as in healthy individuals. Within, the tuber is clouded and discolored, and has an unpleasant smell, and is soon more or less impregnated with a peculiar species of mould, which forms white elevated compact spots on the outer surface, and is distinguished by its curved, fusiform, articulated spores. The grains of starch are found not to be in their normal state, their surface being covered with variously shaped processes.

This disease does not appear to have been sufficiently prevalent in this country to attract much notice. Whether it depends upon the growth of the mould, or whether the mould is merely subsequent to the disease, is uncertain. The mould itself is either very variable, or two or three species of a very similar habit occur on diseased tubers.

As, however, English and French specimens, though they exhibit a form of spores different from what Martius figures, present very material differences of form in the same tuft of mould, I am myself inclined to think that the different kinds may all be referred to one species.

The disease is often acccompanied by scab, which is easily recognised by its rather cup-shaped bordered pustules, the concave surface of which is covered with a stratum of large, more or less globular, somewhat reticulated spores, which are at first greenish, and at length acquire a ferruginous

tint. The spores are attacked at first by a little, somewhat lateral, thread, and usually exhibit a sort of hilum, which Martius has not noticed. They agree in structure with those of a parasite which is sometimes common at the base of a different species of Orobanche, and which has been described by Fries, under the name of Tuburcina. A similar fungus occurs on the leaves of Trentalis Europæ. Martius has referred it to the genus Protomyces, in consequence of not having observed the little thread by which it is attached. The scab occurs principally in ground which has been dressed with rubbish from old buildings, or where the soil is in a very raw and ill-drained condition. It is sometimes very destructive, and is usually to be met with in greater or less quantities in some portion of every crop.

Martius has entered into very minute detail, and at very considerable length, as regards both the dry rot and the scab, but we have stated sufficient to enable any one to recognise them. As in most cases of the diseases of plants, it is more easy to discover the cause than to suggest a remedy, the suggestions given by Martius are confined within a small compass. If the disease arise from the attack of a species of mould, it will, of course, be advisable to take all possible precautions against infection; though, where the spores are so subtle, this is almost a hopeless task. Some good, however, may be expected to result from change of soil, and proper purifying and disinfecting of the storehouses; and more, perhaps, from such a system of culture as will insure the vigorous but not exuberant growth of the crop. I have seen occasionally a good deal of damage among store potatoes, arising, I believe, from this disease; but, as I have not been able at present to obtain specimens of infected tubers from Germany, I cannot positively state that it is identical. The disease of the present year is altogether different from any that has been recorded.

M. J. B.

REPORT OF DR. VON MARTIUS, COMMISSIONER APPOINTED BY THE HIGH MINISTERIAL RESCRIPT OF AUGUST 25, FOR THE ACCURATE INVESTIGATION OF THE POTATO DISEASE IN THE PALATINATE.

[Translated from the Central Blatt des Landwirthschaftlichen Vereins in Bayern, by E. Goodrich Smith, of the Patent Office.]

To the Royal Academy of Science:

In executing the honorable commission of the 25th of August, to institute further investigations, in time and place, for the full understanding of the notices respecting the potato epidemic in the palatinate, for the examination of the locality, the local and general causes, and the more perfect judgment of the original cause generally, I visited, in the end of the month of September, the Land Commissariat at Frankenthal, and I now have the honor respectfully to report the results of my investigations in the following observations, prepared for the further use of the King's Minister of the Interior.

The potato crop of this year, in that region, has suffered a considerable loss. This is not of equal proportion in the particular fields; but while many farmers are satisfied with the product, both in quantity and quality, others in the neighborhood complain of a most decisive deficiency of stalks, i. e.

a failure of more or less stalks, so that the sprouts producing the knobs are either wholly wanting or have put forth only a few small knobs, or none at all. In the first case we observe the rows of the potato hills on the field interrupted, and this is the case in different circumstances. Many times a single plant is missed from the row; many times a whole succession of three, four, six, and more plants. In many this deficiency is scattered about in the same proportion; in others, on part of the field, all remain sound, while still another presents abundant marks of failure. Neighboring fields are often thus uninjured by the disease.*

The dissimilarity of this year's harvest, soil, and climate, being the same, confirms the view already presented—*that the proximate causes of the disease are not to be sought so much in these general circumstances as in local means of injury.*

The failure the present year does not exhibit itself, in the Land Commissariat of Frankenthal, so much in the early potatoes as in the much larger proportion of late patatoes. In the fields which for the most part I have investigated in company with the royal land commissioner, Von Pollnitz, there were everywhere round, middle-sized, white, yellow, or fine-skinned, mealy, clear, reddish kinds of potatoes.

At the first view of the fields in that region planted with potatoes, the circumstance was striking, that, although the stalk in the average had reached the usual development, yet the number of stems which blossomed or bore fruit was very small in proportion. While, heretofore, in Germany, in most regions, the potato stalks have been seen in blossom from the second half of August, and even the present year in many places—for example, on the Maas, in Mannheim, and Heidelberg—(in September numerous stalks were in blossom, and others bearing fruit;) yet in the Land Commissariat of Frankenthal, at the end of September the fields showed but very rarely a blossoming stalk, and the potato balls were few.

But otherwise, *in general*, on those fields which have suffered a loss of plants no visible change with respect to the stalk was to be noticed. Such had, yet further, the usual height and quantity of leaves, and only in particular cases, of which we shall directly speak, did any variation appear in those portions above ground.

A closer comparison of the particular plants on one and the same field showed *a great dissimilarity in the vegetation, as well in regard to the stalk as the knobs.*

---

* This view is confirmed by the different accounts of the disease in Germany, as well as in the ample statement which a Scotch farmer (Charles Ferguson) has collected together from the numerous notices of British agriculturists, inserted in the Journal of the Highland Agricultural Society at Edinburgh. The rot of the stem, in English, taint, failure, rot, dry rot, which made its appearance in an alarming manner in Great Britain, in 1834, as did the epidemic curl disease in 1792, has given occasion to many similar treatises. Ferguson has given prominence especially to—1st, the period of planting the knobs; 2d, the time when the knobs which had set were taken from the ground; 3d, the method of their preservation; 4th, the mode of preparing the potato fields; 5th, the kind and condition of the manure; 6th, the condition of the setting knobs; from what place they were taken; whether they were laid whole or cut in pieces; 7th, the question whether the plants were exhausted, and a renewal of the seed would be necessary.

The views of the British agriculturists are very diverse. But in one point they all agree—that cuttings warrant no surer crop. The general valuable results of the observations alluded to have been employed in drawing up the rules recommended at the close of this report. (*See report on the failure of the potato crop, in the Quarterly Journal of Agriculture of the Highland and Agricultural Society of Scotland, No.* 36, 1837, *page* 477—511.)

According to the results of such a classification of the different circumstances, bringing under view the whole growth, the plants which were found in the fields may be arranged in the following three groups:

Different conditions of the potato plant.

1. *Sound plants*, in which neither the part above or below the soil presents a diseased appearance. In general, these bear no very numerous product. The knobs, also, were not particularly large; an appearance which may be explained by the unfavorable circumstance of the long continued drought of the present year. The agriculturists of the communities visited by me, from the results of such sound plants, look for a moderate crop, or three-fifths of a good one.

Besides, in such plants is to be noted, also, that in small portions of the same the stalk was wholly withered by the 25th of September. Of the remainder, the conclusion was, that they would not be either high or branching; and corresponding to this, the knobs were not very large, but often under middle size; but the plants, which yet stood fully leaved, were provided with more and greater knobs.

2. A second portion of the plants, and indeed the smallest, showed numerous stalks; but these were thinner and more slender, mostly single or slightly branched, yet with many leaves. The leaves frequently bore more leaflets than usual; and these latter were often very small—only a fifth of an inch in diameter. The angles of the stalk were sometimes furnished with a proportionally very broad strip of leafy substance, and this more or less curled. Both sides of the leaves were more than usually set with very fine hairs, which gave the stalk a brownish-green appearance. On the leaves of this kind were also noticed, sometimes, black, burnt, dry places, yet without meeting any rust fully developed. The stalk also showed, many times, black spots. On plants of this description I have met with no blossoms or fruit. The root-stalk presented an unusually large branching, and the branch roots terminated in great quantity of fine fibres. The collective undergrowth appeared accordingly, as it were, an irregular felting of fibres, between which appeared only rarely one or a few knobs of one half to one inch in diameter. On the contrary, the lowest part of the stalk, where it passes into its branching under the soil without bearing knobs, and in the latter itself, which were often disproportionately long, were set with small knobs of pale color, and having a very tender outer skin, of the size of peas, and mostly furnished with leaf buds on their ends.

I hesitate not to explain the above described plants as infected with the before mentioned curl disease, (in French, *la frisole*,) though in a far less degree. But other plants appear smitten with the same disease on the growth above ground, of which nothing abnormal can be noticed, while the knobs exhibit a peculiar variety. Such knobs, indeed, bear long white sprouts, which put forth sometimes singly, sometimes numerous, on every part of the upper surface, and often are so-long that they run out of the ground, where, when they come to the light, they unfold many small greenish-gray, strongly haired leaves, similar to those in the curl disease. Many times this sprouting forth appears as a true, thorough growth, while the uppermost eye of the knob passes out from the so called "crown," over into a new green stalk provided with leaves.

Potatoes which were from plants of this sort exhibited often a variety of

appearance, which can only be distinguished by the experienced, reflecting agriculturist as sickly, and not to be used by them in the next planting for seed. They are usually below the regular size; often not round, but of a distorted, roundish form. Their outer skin is sometimes very tender, and sometimes proportionally furnished with little excresences, and allow the cellular tissue to shine through with a light, greenish clouding. On being cut into, they present a less compact texture, and also offer proportionally less resistance to the knife. The year-ring (Jahr-ring) exhibits a comparatively darker color; and where it breaks out on the outer surface, for the commencement of new eyes, it is often of a brownish color, and encircled by a clear, white, juiceless (nappy) cellular texture. Others, (still of these diseased knobs,) on being cut into, showed themselves to be what we, in common parlance, are wont to call *whetstony; i. e.*, considerable portions were juiceless, swelled up, filled with air. Such potatoes, in essentials, therefore, present the same peculiarities which we find in those which have begun to germinate in the cellar. When boiled, these knobs were tasteless, flat, or disagreeable, and of a fatty substance; and where they had passed over into irregular sproutings, or at least had diseased eyes, they showed the well known, uneatable chits, which are nothing else than the corrupted beginnings of the sprout (the germ-tuber) contained within the substance of the potato.

3. Besides these two already described kinds of condition of plants, there was exhibited yet a third, which has been distinguished by many agriculturists as *the first state of the prevailing disease.* In the plant usually no variation was to be noticed; it appeared much more juicy and leafy, and only sometimes an uncommon quantity of dark-green compact leaves, and the want of blossoms and fruit indicated a deterioration in the knobs. Still, one could not with certainty form a conclusion from the appearance of the plant as to the diseased condition of the knobs; and this diseased tendency first developed itself by the deprivation of the root-stand, which, according to the opinion of agriculturists, is connected with the "loss of the stalks" and the "dry rot." These potatoes have the following characteristics:

(*a*) In one case, there were numerous knobs; but these were small, (not full grown,) provided with a very thin clear-colored outer skin, and many times also somewhat greenish. The upper surface had many little warts, rents, or dark-colored places, with reddish brown spots, like spots of rust. Such half-grown knobs were of a peculiar dried up appearance, and thus less smooth and shining than sound knobs. In some cases, also, the outer skin was wanting in certain small spots, and a white eruption, which dropped off easily, consisting of grains of amylum, took the place of the outer skin; sometimes even these knobs (plainly not yet ripened) already had put forth short sprouts or shoots.

(*b*) In the other case, the stalks, when taken out of the ground, were found to have a moderate amount of knob formation, and the knobs were tolerably large and grown out. But they bore immediately on their surface sometimes one, sometimes more, bunch knobs of the size of a marble, musket ball, or nut. This after-growth, which, according to the opinion of the farmers, owed its existence to a late rain, after a very long drought, is for the most part found on potatoes which exhibit a broken, and here and there dark-colored or light brown, somewhat dry upper surface. The mother knobs, also, on which they sit, have, not rarely, a variation of form,

while in an angular transition-form from the ball-form to that of an irregular ragged body. The bunch knobs themselves are covered with a thinner, often reddish, swollen, outer skin, and not unfrequently bear a cluster of young prematurely-developed eyes.

On the knobs thus changed by disease being cut through, it is noticed that the vascular circle which pervades the whole texture of the knob, and distinguishes the outward (the rind) from the inner part, (the marrow,) is colored darker (yellowish) than usual; but the cellular tissue which lies inside of the vascular ring is softer than the part which lies outside of the same. Such a potato offers less resistance to the knife cutting in than does a sound one; and sometimes little holes are found already to exist in the inside. The inside also differs in color, since it is rather of a milk or slimy white, than of the otherwise prevailing color—yellowish-white, or slightly changing into red. These peculiarities are so visible that many agriculturists regard them as the certain signs of the introduction of the disease. They are wont to call such potatoes, very appropriately, *glassy*—which expression is at other times used respecting those which, being frost bitten, have begun to sprout in the cellar.

If the potatoes described under *a* and *b* are cooked, the substance exhibits the same slimy or fatty state, and the same want of palatable taste which is found in potatoes which have sprouted. In large plants we often also find that the outer part (outside of the year ring) is yet mealy and palatable, whilst the inside has already undergone a slight decomposition, and is stale and harsh. Many times, also, such a potato cooks very differently: some portions remain harder than others, and the rind part, which is still tolerably mealy, crumbles before it is prepared. It is this state which is called by many "the double growth" or "offset." Very often such a dressed potato presents on the cut surface immediately a light violet color, which indicates that some *tannin* has been developed in it—a change which must naturally also make itself known by the taste.

Influence of the premature development of the sprout on the taste and the inner structure of the potato.

It may be appropriate here to notice how this change in the taste of the potato is connected with the untimely commencement and progress of growth and development of the near sprouts. When, indeed, a mother potato begins to sprout, it first takes place in the portion of the cellular texture lying in its centre—the marrow for the after growth. From this the young shoot is nourished, which receives its vessels from the year-ring, and by means of the same stands in the closest connexion with the marrow portion. The nourishment goes on, while, from the centre, the amylum is converted into diastase and sugar, the sugar into slime, the slime into fibrous substance and albumen, and from the last the cellular tissue of the new sprout is formed. In a sound case, the mother potato accordingly is gradually, and in due time, hollowed out from the middle. If it is very large, the sprout growing forth already obtains a considerable development before that is wholly exhausted; in which case it is hollowed out, but near the circumference it remains still solid.

There remains, therefore, in a wholly regular process of nutrition at the end, only the shell, dried up and hanging on the new-formed stem. Where, on the contrary, we observe the mother knob not thus regularly

employed for the nutriment of its offspring, but wholly or partially becoming rotten, there it is supposed that the part which furnishes nutriment to the young sprout has not had a regular but diseased course. The too early, *over-hasty* putting out of the young knobs, as presented in the cases described, is connected with a diseased tendency of the mother knobs, *which does not check, but too much hastens, the usual periodicity in their production*, in consequence of which the decomposition of the cellular tissue must become putrefaction; which I have met with, in all such cases, in place of the regular exhaustion, even to the skin.

State of the present crop in general.

If we lay the already stated circumstances together as they have been observed in the open field, in the Land Commissariat of Frankenthal, we shall arrive at the following general result:

The vegetation of the potato plant appears in the *highest* degree. The whole progress of its growth, even in kinds planted under similar conditions of soil, climate, and culture, and in the same region, is *very different.*

The *stalk part* is partially retarded in its development, so far as the observation in general could be ascertained, so that it came to the blossom more seldom and more various than for some years.

The *knobs* did not ripen equally in a short period, but took a more gradual succession.

The *quantity* of the most domesticated potatoes is only a middle crop or below a half crop.

The *quality* in not an inconsiderable portion of the crop exhibits itself already as small, indeed inferior, inasmuch as these potatoes have no good taste. Their present condition renders it probable that they will not preserve long in the cellar.

I must here also add, that the peculiar irregularities which we have already mentioned have been found in different kinds, and as well in those potatoes which were grown from entire potatoes planted as in those from cuttings.

A part of the potatoes are already diseased, or have such a tendency in the field.

From the above mentioned facts we may very justly conclude that a part of this year's crop of potatoes were not wholly sound, *but already disposed to disease, or really diseased, in the field.* But as now experienced farmers in these peculiarities which are exhibited in such diseased potatoes *recognise the first symptoms of the dry rot*, it hence follows *that the dry rot did not originate first over winter in knobs before wholly sound*, but that the *foundation* or *germ* of the disease *was transmitted from the field with the potato into the place of preservation*, and that consequently *the disease fully developed*, namely, the remarkable hardening and the appearance of peculiar fungus in the upper surface, *was produced where the circumstances prevailed to favor such a development in the primary source of the disease.*

The disease is connected with the fungus as the primary source or origin.

For the scientific stand-point of the investigation, the question now especially is important, whether this disease consists merely in a peculiar de-

struction of the vital power, and in a corresponding decomposition; or, whether, according to the conclusions of my earlier investigation, the germ of a parasitic fungus already exists in the potato on the field, in which case it must be recognised as the original cause of the disease.

The investigations which I have instituted on this year's potatoes, on the field itself, confirm the last opinion most fully, as I have found the germ of the fungus also in such knobs.

We may observe, indeed, without trouble, and with the eye simply, the potatoes described under letters *a* and *b* (which were distinguished by experienced agriculturists as the first stage of the dry rot,)—fine, white, little points here and there scattered beneath the outer skin; these, through the clearer color, distinguish themselves before the rest of the cellular tissue, and give it the appearance as if little grains of meal were enclosed or sprinkled on it. On closer examination, it is found that these little white points, as it were, in nests, i. e. united in small round or oblong spots, lie in the cellular tissue. They are found especially in the outer portions of the tissue, between the year-ring and the outer skin. Slightly magnified, they appear as irregular shaped, yet for the most part rounded, opake, white, shining grains; when strongly magnified, they exhibit themselves as a slime. But after being yet stronger magnified, from three hundred to four hundred lines, we can detect in these little invisible points an uncommonly fine tress-work of wreathed, ramified, half opake, here and there dismembered fibres, wholly like those which I have acknowledged, from the cases of disease before more fully described by me, as a fungus texture of the *Fusisporium*, and represented in table 3, figure 23, of my treatise. Here and there, also, are seen in the cellular tissue those disproportioned, globular, and for a time still half opake, pale yellow little bodies, which are the commencement of the original fungus, *(Protomyces Solani,)* and represented in table 3, figure 21, of my treatise.

In other knobs, even when first taken out of the ground, I noticed, as mentioned above, that here and there little portions of the flesh broke through the outer skin in the form of irregular clusters of small white grains. By the miscroscope they were proved to be grains of amylin, on which little excrescences and bands had begun to form, which I have represented in table 3, figure 34, and have distinguished as the earliest organization of single fungus fibres.

The last appearance also observed in knobs artificially infected.

This appearance wholly agrees with that which some before sound potatoes presented to my view, which were artificially covered with fungus dust, and which were also thus inoculated. The outer skin of the same first showed rotten, brownish, dry spots, by which the whole knobs plainly lost in moisture; three months after, the infection broke out of the outer skin here and there, and the diseased cellular texture pressed through in the form of little white bunches of meal, the grains of amylin of which at the same time, attended with small excrescences, callosities, and bands, might be recognised as the medium of the fungus texture in its earliest period. In sound potatoes, the starch meal never shows the above described beginning.

The germ of the fungus texture already existed on the field, and became developed in the most unfavorable circumstances.

The experiments hitherto made by many investigators of nature have placed it beyond doubt that the first germ of a fungus texture may remain for a long time in its primary, incomplete state, without losing its vital power; but that, in circumstances which favor its perfect and entire growth, it always more and more developes itself, increases in size and extent, and finally reaches the state of ripened fruit, where it then puts forth numerous germs as grains, and thereby accomplishes its propagation. *On such a growth of fungus texture, the moist, warm weather has the most important influence.* No fungus grows in a temperature below 2° or 3° of Reaumur. For, on the contrary, a high temperature up to 15, 20, or more degrees is very favorable to its development, of which any one may be convinced by the common mushroom of the sewer and of the marshy beds of botanic gardens, which are well known to be often covered by the vegetation of the *Aethalicum flavum.* It follows, therefore, that potatoes in which the germ of the fungus already exists undergo the progressive deterioration even to the highest stage of the dry rot, not in all places, but only where they have been surrounded with a damp atmosphere, and have been shut out from the light, while in the winter and spring a considerable temperature is developed.

The inquiries which I have instituted in the Land Commissariat of Frankenthal, as to the condition of the place where sound or diseased potatoes have been preserved, confirm this opinion.

A great landholder in Petersau, who was accustomed not to bring in his stock of potatoes into cellars beneath the ground, but in parts, of slight depth, of a large barn furnished with dry walls, has not yet suffered from the dry rot; on the contrary, we find that agriculturists, whose crops have been injured, have been accustomed to fill in their moist dark cellars, shut out from the draught of air, wholly with knob-fruit, where is also a heating, and with this the essential condition for the formation and greater development of the fungus texture, and consequently of the higher stage of the dry rot, which hardens the potato, and renders it wholly unfit to be eaten. Many weighty authorities have lately represented this heating as the *sole original cause* of the dreaded disease. On the contrary, I consider myself justified in setting it down as only *an essential condition of the last form of the dry rot.* Without the peculiar co-operation of the fungus forming itself out on the heated potato, the knob fruit might wholly lose its power of germination and good taste; but it cannot escape the view, how the fruit, also, may in itself thus present that peculiar and so greatly diverse character of *a sort of fungus hardness, with a contemporaneous production of a mouldy fungus on the upper surface,* and, indeed, always of one and the same sort, when the fungus does not thereby perform a definite part. By the heating, in the cellar, the potato suffers a commencing decomposition; a part of the starch turns into sugar; and then, by means of the processes of germination, as they begin, into stringy substance. From this it goes (if hindered in the proper development of its shoot) over into the *wet* rot. The quantity of water in it will hereby, indeed, be hardly as much lessened, as is the case in the dry rot where the knobs lose half of their watery substance. That, on the other hand, the potato contains the same peculiarity by means of which it resists the operation of the water in which it is cooked, and, indeed, also the steam of water; and after it has been cooked for six hours, so that it can only be cut with a very sharp knife, as a

moist spunk—this circumstance is merely the consequence of the fungus development.*

Contradictory, also, as this fact must appear at first view—that a tender, mouldy fungus may exert this drying up, hardening influence, rendering it tough on the substance of the potato—yet it stands not isolated, but is well known as analogous to the effects of other fungi. The sepedonium mycophilum, a little yellow filamentous fungus, which grows on flesh-colored mushrooms, thickens the cellular tissue of this latter so much that while otherwise it rots in the last warm days of autumn, now affected by this parasite, it not seldom withstands putrefaction during the whole; and yet, in the spring of the next year, is found dead, indeed, but preserving its original form. In a similar manner, also, other fungi which grow on wood—as, for example, species of the warty mushrooms, thelephora, and the inflated mushrooms, as sphaeria—produce such a peculiar drying up and contraction of the wood, which draw out in the same manner its albumen, as does the fungus of the potato spoken of†.

Of the fungus found in potato cellars.

In the house of Burgomaster Von Heissheim, who, as an agriculturist, for many years has suffered much from the potato rot, I noticed that the walls of his moist, damp cellar were here and there covered by a very fine web of white filamentous fungus. The same extended itself, even as such vegetation otherwise is wont to do, out from a middle point to every side for some inches diameter. This covering was scratched off, and in Munich was subjected to a careful microscopic observation. It consists of very fine ramified complicated fibres, and it is probable that it is a mother fungus, slightly developed on account of its barren situation, and of the same kind of vegetable growth to which I have attributed so important an influence on the existence and formation of the dry rot. It may not be impossible that the close contact of the potatoes, stored up within the walls, with the fungus mould vegetating there, may have been the means of infection, and contributed to the appearance, inexplicable to the agriculturists, that one row of seed potatoes did not shoot forth, while another from the same cellar developed themselves regularly and in a healthy manner. Besides this, the occurrence of a mother fungus, not on the potato itself, but in other places, which group themselves under certain favorable circumstances in the same, and here are extended with much greater rapidity than elsewhere, may be considered as an appearance of which we find many analogies in nature, and it must be looked upon with reference to the inexplicable mode of the spreading of the disease, as if it was a contagious epidemic. It is thus with the increase of the dry rot, just as with the sudden appearance of certain destructive insects, which also are not newly generated, the eggs of which still more always exist, but only reach their development under favorable circumstances.

---

* Very justly says the intelligent agriculturist, Knight Von Kalina: "Although the heating of the potatoes during the winter preservation must unquestionably have promoted their rotting, yet the wholly peculiar disease distinguished by the name of dry rot cannot so be explained only. This heating must be followed by a fermentation and a wet (not a dry) rot, arising therefrom." (André Oekonomische Neuigkeiten und Verhandlungen, 1842, n. 69, p. 549.)

† Compare, as to this peculiar effect of cryptogamous parasite, *Treviranus* Physiologie der Gewächse, Band II, 792, in Bavaria, 1842, p. 443.

Microscopic discoveries in diseased potatoes which bear on them no fungus formation.

The potatoes mentioned under 2, exhibit under the microscope more or less extended variation from the regular formation. The appearance most visible in them is a deficiency of grains of starch in the cellular tissue. The same is the case also in those which are yet juicy throughout, but which are of a soapy or fatty state, as well as in those which are already become whetstony.

(*a*) Many cells contain, in these cases, scarcely any grains of starch. They are filled with liquid or air, and their skins are withered or flabby.

(*b*) In other cells the grains of starch are balled up together in the middle, in the form of round balls; or,

(*c*) They hang in clusters heaped up on the sides, especially in the corners near the intercellular passages.

(*d*) These last are not seldom wholly stopped up—that is, filled in with an opake, shiny mass, a shapeless clot.

(*e*) The vessels of the year-ring are of a darker color than usual. The same is the condition of the vessels which run from the year-ring outward, to the eyes in the so called germ-tubes. The texture near the last is often juiceless, and, as it were, standing off, (nappy.) Thus, as also the condition of the new sprout shows itself changed, diseased, at the earliest period, it cannot be thought strange if the same shoots out no new stalks, or retains only a very weak power of production.

All the above mentioned appearances are found more or less decisively in those seed potatoes which have already put forth sprouts, and in consequence have dissolved a portion of their texture and employed it for the development of new stalks. Thus with such knobs, already provided with sprouts, the change described shows itself always in the inward parts of the cellular tissue; *i. e.*, inside of the year-ring. These appearances, therefore, indicate that those potatoes which have become fatty, or whetstony—and which, on account of their less size, and of a weaker portion in the starch formation, are to be considered *as not yet ripened*—have begun with a sickly haste to develope their eyes. It is evident that their offspring must likewise be feeble.

Finally, I further notice that the scab or scurf was scarcely observed by me in this region, or with less intensity, while in Upper Bavaria it appeared to be spread about abundantly.*

Result.

From the comparison of the facts, and with respect to the location with which they are connected, the following general conclusion is drawn:

For the irregular vegetation of the potatoes (the deficiency of stock) observed in the Land Commissariats, and the rotting of the knobs in the cellars, two diseases, the curl disease and the dry rot, are original causes.

The curl disease, which appears hitherto to be developed in no high degree, depends on an irregular vegetation of stalk as well as of knob, on account of unfavorable circumstances of climate and soil and disproportional

*Some have accounted for this disease especially from the excess of protoxide of iron in the soil.

culture, whereby the knobs lose in their starch substance and imbibe a tendency to put forth untimely sprouts.

The stalk rot was *occasioned* by a nesting of the fungus texture in the knobs, which injures the chemical mixture, and so gains the upper hand in the knobs, by favor of a heating method of preservation, that this becomes unfit for germination, and, by means of the hardening of its cellular texture, can no more serve for nutriment. This disease also affects sound knobs as well as those which spring from curly stalks.

While the curl disease appears to have been for a long time known as an epidemic, but not infectious, that which for ten years has been known as the dry rot has at its foundation a concrete contagiousness.

Against the former, therefore, must be prescribed all those means which rational husbandry generally recommends; against the latter, likewise, a careful removal of contagion, and guarding from those circumstances which favor the spreading and development of the contagion.

Precautionary rules against these diseases.

Let there be a careful previous assorting of the potatoes harvested, and a choice made only of such knobs, for future planting, *as are sound and well ripened.*

For this purpose reject all knobs—

(*a*) Which have reddish, or brownish, or black spots, with cracks and splits of the outer skin; or,

(*b*) Such as are affected with knots, warts, or with any appearance of mould;

(*c*) Or on which are set other little tubers;

(*d*) Which have a thin upper skin, partly scraped off, or of a color turning to green;

(*e*) Which, by their smallness, or by the adherence of long pieces of stalk under the ground, show that they are not yet fully ripe;

(*f*) The form of which is angular, or remarkably irregular, varying from those of the well-formed kind;

(*g*) Which are withered, wrinkled, hard, or exhibit a diseased variation of the eyes;

(*h*) Which have been cut in or bitten, or otherwise wounded;

(*i*) Which have already begun too soon to sprout in the cellar. The practice of planting such potatoes, again deprived of their sprouts, is in every respect very faulty.

We should not employ a potato as a seed potato which on one side appears wholly sound, but which on the other bears on it any of the above mentioned traces of a diseased state; the assorting of the necessary seed potatoes (so far as such have not already been brought in separated) should be done in the day light, so as not to overlook the diseased state. We should choose, for preservation of seed potatoes, most suitable places, as far separated as possible, which are safe from moisture, cold, and heat.

Remember that seed potatoes piled up high, not only in winter but also in spring, when they begin to sprout, undergo a heating, and thus become injured in their power of germination; which, therefore, must be carefully provided against. Moreover, let there be an assorting of the great heaps of potatoes for use, by means of a grate or sieve, which will separate the knobs according to their size. Save out the large, well ripened knobs, separate

from the smaller and later, and use the latter, before the rot has affected them, earlier than the former.

Preserve also these collections with all possible care.

If the cellars are not clean, whitewash the walls and strew the bottom of the cellars with dry sand mixed with coal dust, ashes, or sifted cinders.

Take care as to the proper access of air; set poles perpendicular in the cellar, which are to be wrapped around with pea straw, and about which the potatoes are to be heaped up.

Turn over these heaps during the winter.

Improve the vital power of the potatoes to be cultivated, by those means which a rational method of agriculture, having respect to local circumstances, and those of climate generally, recommends.

Try to obtain and preserve an appropriate, strong stock, or race. This may be done by a selection of sound, strong, ripe seed potatoes from the kinds which agree with the location.*

Let there be prudence in the naturalization of a kind which has been formerly raised under very different influences. Cultivate the kinds separately, and not together.†

Choose the most favorable soil, the best situation, and the manure and rotation most appropriate for soil and climate.

Put the manure on the field before winter. In England, it is recommended to mix horse and cow dung; to withdraw the same from the direct rays of the sun, and plough it under in every case as long as possible before planting. Swine dung in Thuringia has operated unfavorably. Fail not in a careful preparation by cleaning out, loosening, and heaping up.

Avoid laying seed potatoes too early or too late, or in unfavorable weather. (Local experience must be principally relied on here.) ‡

Leave not the seed potatoes long uncovered in the furrows, and let not these last dry up too long in the sun.

Beware, lest the seed potatoes themselves, selected with care, should be attacked with fungus germination; and therefore soak them some hours in lime water, and after they are dried off again in the air put them in the field. This treatment destroys also any insects or their eggs which may be attached to them. Experiments made in the Royal Botanical Gardens, with laying in lime, have proved that potatoes which have lain ten hours in lime water have not lost their germinating power; which, indeed, was the case with such as had lain from 24 to 36 hours in lime water.

The method of laying cuttings instead of whole potatoes, should in no case be adopted in the present unfavorable circumstances; as, without

---

*To improve the stock by derivation from seed, I do not consider necessary. By such a method, in general, two years are lost; and in the third, there is yet the labor of separating and collecting experiments in favor of their employment in given situations, as to the various kinds which have been produced. Similar are the views of experienced agriculturists; as, for example, Professor Schweitzer, (Allg. Anzeig. d'Deutschen, 1841, No. 341–344.) We have the experience already (for example, of Mr. Albert, in Rosslau,) that the knobs from stocks which have been produced from the seed were also attacked by the dry rot. There is, therefore, in this method, in no way any protection against disease.

†The English farmers recommend, after some years, to import new seed potatoes from higher situated regions.

‡In general, it seems more advisable to put the potatoes into the soil too early than too late. The practice of laying them too late, even in June, has undoubtedly contributed to enfeeble many races.

doubt, it has exerted an influence in the deterioration of the race, and will exert the same in a higher degree.*

* Gather the crop not before it is ripe.

Throw not those potatoes which are affected with mould, or otherwise useless, on the dung hills, but into running water, or bury them in a place which will not be ploughed up.

The adoption of the above mentioned rules must essentially contribute to limit and gradually eradicate the diseases at present so injurious, and increasing in such a threatening manner.

DR. VON MARTIUS.

MUNICH, *November* 4, 1842.

---

*The agriculturist who will not break off from the practice above mentioned, as bad, should at least take care that only sound cuttings, well provided with eyes uninjured, should be planted, that they be not cut too long before placing, and that those cuttings be rejected which change visibly in color on the surface of the cut. The sprinkling over of the cut surface with powdered lime is recommended by many agriculturists as a proper improvement.

APPENDIX No. 7.

GRASSES FOR THE SOUTH.

Editor of the Cultivator: Your correspondents frequently inquire respecting the grasses suitable to the south. If each would communicate what he has observed, it would be a sufficient answer to such inquiries, and might prove the most important benefit to the agriculture of the south. During this winter I have seen bundles of *northern hay* brought to the stables of my neighbor, which had paid for carriage many hundred miles round the capes of Florida, through the gulf of Mexico, and five hundred miles (by the course of the river) into the interior. This is a *standing reproach* to the agriculture of the south.

Lucerne.—This is found to grow well here. Sow it in drills, in the early part of the fall, 24 to 27 inches apart: it flourishes, yields four to five cuttings in the course of the year; and, on soil which would bring twenty bushels of corn to the acre, grows one foot and a half high. This season, some was cut on the 12th of March, for soiling, and was then from a foot to knee high. The most of it has been cut twice over, since the first cutting to this day, May 13. Cattle and horses eat it greedily. A cow fed on it chiefly is yielding at this time between five and six gallons of milk daily; when, as yet, there is no grass in the woods or on the common sufficient to change the poverty-stricken appearance of the cattle in "the range." I have made no hay from it, but have no doubt it will make good hay.

Guinea-grass.—The root is similar to that of the cane or reed, and is perennial. The stem and blade are like those of the Egyptian millet. On rich soil it is very luxuriant, yielding many cuttings in the course of the year. It is good for soiling; horses and cattle eat it readily, and, if cut when in flower, it makes a hay most abundantly, of which cattle feed greedily in winter. Horses do not seem to like the hay. It is most readily propagated by the root. A small root, two inches long, with one or more joints to it, will vegetate; and, if the ground is made loose by ploughing once or twice during the season after planting, roots placed in checks of four feet will take *complete possession of the soil the first season*, so that the next spring it will start up evenly over the soil, everywhere. Hogs root after them with great eagerness; and as the tendency of this plant is to fill the ground with roots in so thick a mat that the grass does not grow tall in consequence, the idea suggests itself of pasturing cattle on this grass in the spring and summer, and giving the hogs the benefit of the roots in the winter. They cannot destroy it; the smallest fibre left in the ground will grow. It might be a great pest in a *garden;* but if land is to be used for stock, it will take and maintain entire possession, to the exclusion of any competitor which we have in middle Alabama.

Clover and herds-grass.—I have now a beautiful lot of these grasses in conjunction, on high land; the whole about knee high, and the clover in flower. Mr. Kirby, one of my neighbors, cut the wood from a piece of low, pipe-clay, crawfish land, last winter; and when the brush, &c., lying

on the ground, had become sufficiently dry, he set fire to it and burnt it all off; thus giving it a top dressing of ashes. He then sowed herds-grass on the top of the ground, without plough, harrow, or any thing of the kind. He now has a most rich and beautiful crop of this grass growing. If desired, your readers may obtain further particulars of this crop.

Leersia Orizoides, (rice grass.)—This plant so much resembles *rice*, that only a practised eye can distinguish it. The negroes on the rice plantations in Carolina call it "*the rice's cousin.*" It will grow wherever rice will—*in the water*, or in any damp situation. It is found wild in all the southern country; grows tall, seeds in a panicle, not unlike a head of oats, and will yield two crops a year of *choice hay*. Roots perennial.

B. M.

TUSCALOOSA, ALA., *May* 13, 1845.

From the Mark Lane Express.

GURNEYISM.

This term, of whose meaning perhaps nineteen-twentieths of our readers are utterly ignorant, is applied to a new and particular kind of manuring, which has been employed with signal success by Mr. Gurney, a farmer in East Cornwall. The operation consists in covering grass land with long straw, coarse hay, or other fibrous matter, about twenty pounds to the fall; allowing this covering to lie till the grass springs through it (which it does with astonishing rapidity) to the desired length, and then raking it off to allow the pestial to reach the pasture. The covering is then applied to another portion of the field; the operation of removal and covering being repeated so long as the straw or hay remains sufficiently entire to admit of convenient application. The merits of the system, which is yet in its infancy, was thus stated by Mr. Gurney at a late meeting of the East Cornwall Experimental Club: "About seven weeks since, he had covered half a field of grass of three acres in this manner, and about a fortnight ago, when examined, the increase had been found to be at the rate of 5,000 pounds per acre over the uncovered portion of the field. At that time the straw was raked off and laid in rows twelve feet apart on the field, and one hundred and fifteen sheep were put on the grass, with a view to eat it down as quickly as possible. After they had been there about a week they were succeeded by twenty-six bullocks, to eat off the long grass remaining, and which the sheep had left. The field was thus grazed as bare as possible. The same straw was now again thrown over the same portion of the field from which it had been raked; and, on inspection that morning, he had found the action going on as powerfully as on the former occasion. He thought the sheep, on first raking off the straw, were not so fond of the grass as they were of that uncovered; but after twenty-four hours' exposure to the sun and air, he thought they rather preferred it. He had forty acres now under the operation, and in consequence of it he had grass when his neighbors had none." Fibrous covering, or Gurneyism, as thus described, is certainly a cheap and convenient mode of manuring; all that is wanted is only further experiment to test its general applicability.

From the Cultivator.

CUTTING AND CURING HAY.

From our notes of the discussion on "the proper stage for cutting grasses, and the best modes of making hay," at the seventh agricultural meeting in this city, we give the following:

Mr. Bement said he had formerly been in the habit of cutting timothy grass quite late. It was easier cured after it got pretty ripe. But he found, in using hay thus cut, that it wanted substance, and he had ascertained that the best time for cutting was while the grass was in blossom. In making clover hay, he had adopted Judge Buel's plan. He thought it best not to expose it much to the sun. His practice was to cut in the morning, let it lay till noon, and then cock it, and let it sweat for two or three days, according to the state of the weather. On putting the hay in the barn, he had used about four quarts of salt to the ton. Hay thus managed came out in the spring very bright and sweet. In the ordinary way of curing clover hay, the best parts are wasted.

Mr. Howard was aware that there were different opinions as to the proper stage for cutting grass; but he thought the observance of certain principles might afford a guide in the case. For example, the stems of grasses were filled, just before the formation of the seed, with a starchy or saccharine substance. In perfecting the seed, the stems were exhausted of this substance, it being consumed in forming seed. Now, if the herbage is the object, the plant should be cut before the nutriment has passed from the stems. If seed is the object, the plant must, of course, be allowed to attain a good degree of maturity. Hay made from ripe grass may "go further," or "spend better," as the argument is; and it is admitted that this may be true, for animals are less inclined to eat it; but this is no proof that it is more nutritive. He spoke of the different modes of curing hay, with nearly all which he said he had been acquainted. Clover hay was altogether better when cured in cock than by any other mode he knew practised. All hay was better for undergoing, to some extent, a sweating in the cock. Coarse timothy was thus rendered much softer, and was less strawy and stiff, and every description of hay was less likely to be "mow-burned."

Mr. Betts was not in favor of mowing a great deal of grass while the dew is on. He was in the habit of spreading the swaths as soon as the ground was dry, and he always had it well cocked up before night. The next day, if the weather was good, he opened it again: if it did not dry enough, he put it together again; but his object was to get it so that it would do to put it in the barn. He was in favor of using a little salt with it. He had sometimes found his hay heat too much in the mow. From being hurried, he had occasionally put a load in the barn too green. To stop the heat and fermentation which had ensued in such cases, he had made holes in the hay with a crowbar, and scattered in salt. In this way he had stopped the fermentation, and saved his hay in very good order.

Mr. Garretson, of the assembly, from Dutchess county, said he generally cut from 150 to 200 tons of hay per year, chiefly timothy and red-top. He generally begun when the grass was in blossom. His method was to cut in the morning, spread the swaths lightly, and in the afternoon put it in cocks. The next day, if the sun came out, it was again spread, and, if made enough, put in the barn with a little salt sprinkled on it. About three quarts of salt to the ton was as much as he used. There was danger

of using too much. He had formerly used more salt, and was satisfied his animals, particularly sheep, had suffered by it. It occasioned scouring, and, by keeping their bowels out of order for some time, they died. He usually got about two tons of hay to the acre. In the latter part of the season, it would sometimes make enough in one day.

Mr. Mack always directed his men to make hay as rapidly as possible. He had often made it and put it in the barn in one day, and never had better hay. He was always particular to secure it from dew when it must be left over night. It is said by some who had much practice in making hay that it is never injured from its own internal juice, but only from rain or dew.

Mr. Sotham did not like the plan of salting hay, neither did he like the hay that was made in one day. If it could be so made that it would take no hurt in one day, it must have been too dry for good hay before it was cut, or else very light burden. He would as soon have good bright straw for cows or sheep as timothy hay after it had gone to seed. He cuts clover when a part of it is in blossom and part in the head; cuts all his grass early. It takes longer to make hay cut thus early; but for cows, and sheep especially, it was a great deal better. The objection to salting hay was, that animals were forced to eat salt, whether they wanted it or not, and it made sheep scour. His hay came out of the barn of a bright green color, and his stock would fatten on it. There was another great advantage in cutting early: the roots retained their life and strength better, and the after feed and future crops were much more abundant. He did not like timothy for hay; he never saw it in England; the farmers there thought it was too coarse and wiry for stock. Rye-grass made good hay; would yield in England two tons per acre. Pacey's was the best variety; red top made good hay. He had tried sainfoin; it did not come up well; there was always a difficulty about it in this respect, because the seed was good only a short time; it could hardly be brought across the ocean and vegetate. If we could get it here, it would be very valuable, especially for dry lands. As to pasturing mowing lands, some land would not bear it, particularly if wet; but he fed his dry lands very close, in the fall, with cattle and sheep, and experienced no damage from it.

Judge Cheever said he would cut his clover in blossom—not sooner. He would let it take the sun one day, but not enough to have the leaf break off, then put it in small cocks and cure it, until, by a few hours' drying, by turning over and breaking the cocks, the fluids would be so far out of it that it may be housed without hurting. The length of time necessary to cure it will depend upon the state of the weather, and the larger or smaller growth of the crop. Upon this the farmer must exercise his judgment.

He would not cut timothy until it had passed out of the blossom. Professor Davy, in his Agricultural Chemistry, says that 64 parts of clover hay, cut in blossom, produced 10 parts of nutritive matter, and the same taken in seed; timothy 10 parts in blossom and 23 in seed. This, in the timothy, is probably too much; but that the nutritive matter in timothy improved after the fall of the blossom he had no doubt. Red top comes to maturity later, and he did not think there was much difference whether cut in blossom or soon after. He believed timothy cut in blossom would, pound for pound, produce more milk when fed to cows or sheep than it would cut afterwards; but for horses and other stock, he thought it more nutritious to stand a little longer. It certainly improved in weight.

He preferred mowing his hay, as far as he could, when free from dews or water. He let the swaths take the sun a few hours, until the top got a little wilted or seared, before turning. It thus held up the greener parts when turned over and spread, and permitted the air to circulate under it. It also gave the ground between the swaths time to dry, which was important in hastening the curing. In this way, he avoided the necessity of turning the hay after being spread, which was one of the most tedious processes through which the hay had to be passed, and of course the most expensive. He never permitted his hay to take a dew when it had sun enough to wilt it considerably, if he could help it. The dew discolored it, and he had never been able to restore the fine fresh color afterwards. He preferred letting his hay stand over night in the cock. He could then better tell of its fitness to be housed. It is very easy to break up the cocks and give it more sun if necessary, and the slight fermentation or sweating in the cock, which is checked and dried off in carting, is a great preventive against heating in the mow. Hay heated in the mow is sure to be discolored. Some people insist that it is not injured for feeding, especially to cattle. It may be so. I know that flour, corn, or oats, which have been heated until they are musty, are thought not so good. I do not know why hay should be.

On the approach of rain, I always put all the hay that has had any sun of consequence into the cock. If the storm is a long one, it may turn yellow, so that it cannot be restored, but it will retain most of its nutritive matter and its weight; whereas, if left spread out to take the rain, it loses both, and is much worse discolored. I never use salt upon my hay but upon compulsion. When the weather is good, I dry my hay sufficiently to keep, and as soon as I can I house it; but sooner than leave it out to take a storm, even in the cock, I would put it in a little short dried, and apply salt to save it, as I would sooner have it salted than musty.

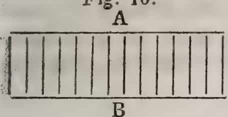
Dr. Lee thought it the best way to mow grass after the dew was off; spread it, dry it as much as possible, and rake it into winrow. If it was dried enough—and it would frequently be so—he would load it from the winrow, and save the labor of cocking it up.

Depth of sowing grass seed.

NO. 1, COVERED $\frac{1}{4}$ INCH DEEP.		NO. 2, COVERED 0 TO 3 INCHES DEEP.													
Kind of plant experimented on.	Total of each kind.	0	$\frac{1}{4}$ inch.	$\frac{1}{2}$ inch.	$\frac{3}{4}$ inch.	1 inch.	$1\frac{1}{4}$ inch.	$1\frac{1}{2}$ inch.	$1\frac{3}{4}$ inch.	2 inches.	$2\frac{1}{4}$ inches.	$2\frac{1}{2}$ inches.	$2\frac{3}{4}$ inches.	3 inches.	Total of each kind.
Lolium perenne, (perennial rye-grass) -	348	29	30	27	19	16	19	14	12	11	9	8	4	-	198
Italicum, (Italian rye-grass - -	276	24	21	20	13	13	10	11	8	9	6	5	5	-	145
Dactylus glomerata, (cock's-foot, or orchard)	300	30	22	15	15	10	9	7	5	2	-	-	-	-	115
Festuca elatior, (larger fescue) - -	312	29	24	20	16	13	13	11	9	4	2	1	-	-	142
pratensis, (meadow do) - -	324	28	28	16	12	10	6	9	4	2	2	-	-	-	117
heterophyllas, (various leaved do) -	348	31	23	20	18	12	9	6	4	1	-	-	-	-	124
diriuscula, (hard do) - -	360	30	23	10	15	10	8	5	3	1	-	-	-	-	114
Alopecurus pratensis, (meadow fox-tail) -	192	17	17	16	15	12	7	6	3	1	-	-	-	-	94
Phleum pratense, (timothy) - - -	528	52	39	37	19	16	15	7	5	-	-	-	-	-	190
Poa nemoralis, (wood meadow grass) -	228	24	14	4	1	-	-	-	-	-	-	-	-	-	43
Plantago lanceolata, (rib grass or plantain do)	252	22	25	19	17	14	11	10	8	6	2	-	-	-	134
Trifolium pratense, (red clover) - -	192	17	16	14	11	11	8	4	4	-	-	-	-	-	85
repens, (white clover) - -	144	13	11	6	4	3	1	-	-	-	-	-	-	-	38
Medicago lupulina, (yellow clover) - -	96	12	10	8	6	4	2	-	-	-	-	-	-	-	42
	3,900	358	303	241	181	144	118	90	65	37	21	14	9	-	1,581

The above table, showing the results of an experiment given in the Journal of Agriculture, for the purpose of proving the best depth for burying the different kinds of grass seed, cannot fail to be interesting and valuable to our farmers. It was performed as follows: Two boxes, each one foot wide, and five feet ten inches long, were filled with soil—No. 1, to within a quarter of an inch of the top; No. 2, to the top on one side, regularly sloping to within three inches of the top on the other side. Both boxes were then divided across by slips of wood a foot long and two inches broad, so as to leave fourteen spaces, one foot long, in each box. Fig. 16 will show these divisions—box No. 2 being filled to the top on the side A, and three inches from the top on the side B. The same weight of seed was sown in each box, the slips of wood were removed, and the boxes filled to the top with soil. The seed in box No. 1 would thus be all buried a quarter of an inch deep; and in No. 2, from no depth to three inches. They were placed in a green-house, for the first ten days, to prevent the risk of heavy rains, which would have crusted the surface. This may have caused the seeds to spring from a greater depth than under other circumstances.

Fig. 16.



The quantities of each sown, (except timothy, which was about double the rest,) were such as would have produced about the same number of plants to an equal surface; but the experiment being performed in summer, (August 1,) the different kinds had variously diminished in vegetative powers. This diminution with clover is such that the experimenter, S. D. Stirling, remarks, that cloverseed "kept over one summer would be dear at half price."

The whole furnishes a striking exhibition of the loss sustained in all cases by harrowing grass seed deeply into the ground. This is especially the case with very small seeds, as timothy and wood grass—none of the latter vegetating an inch beneath the surface, though this remark would more strongly apply to a heavy than to a light soil.

The writer also makes the excellent recommendation to "all who would avoid disappointment, to prove *all* their grass, clover, and turnip seeds before sowing, by sowing a small weight in a pot, and placing it in a warm situation, and counting the plants which come up"—by which they will often find that 30 pounds in some cases will be cheaper than 20 pounds in others.

The scientific names of the plants are given to prevent mistake where different common names are known in different districts, and which have enabled us to add or substitute some common names in place of those which are nearly unknown to our farmers.—*Cultivator.*

SOWING OF GRASS SEEDS.

The fifth monthly meeting of the "Stirling Agricultural Improvement Club" took place on the 14th of April, 1843, when, after some preliminary business, the following paper, on the sowing of grass seeds, was read by Mr. David Drummond, of the Agricultural Museum, Stirling, and 58 Dawson street, Dublin. A lively and interesting discussion took place. The members then resolved:

1st. "That the land should be well pulverized and rolled, immediately prior to sowing the grass seeds; the seeds should then be carefully sown, and covered in as *lightly* as possible, and again rolled."

2d. "That the quantities and varieties specified in the essay are, in the opinion of the club, well adapted to the generality of soils."

On the sowing of grass seeds.

There is perhaps no branch of cultivation where so much of what may be called random practice has existed, or where the execution of the work on correct principles will tell with more effect, than in the sowing of grass seeds. It is a subject on which a great deal might be said; in a comprehensive view, however, the following remarks will, we conceive, embrace the most essential points.

I.—*Preparing the ground to be sown.*

It is almost needless to say that the land should be in good condition, well worked, and free of weeds, which it generally is after green crop or summer fallow; the usual way is to sow the seeds immediately before the last turn of the harrows, when grain has been sown, though sometimes a little additional harrowing is given, by way of *insuring* a better braird. I have known no less than three turns of the common harrow having been given to timothy seed: the consequence was that scarcely a plant ever appeared. Instead of all this I would say, roll well, if the weather admits of it; and even previous to sowing, this operation is to be recommended; for the benefit arising from firming of the surface will of itself more than repay the trouble; besides, by thus making an evenly bed for the seed, the foundation is laid for a more regular covering, and the seeds will come up *flush*, or together—a point not to be overlooked, if we would secure the greatest number of plants.

II.—*The kinds of grasses to be sown, and quantity of seed per acre.*

The kinds must depend on the object in view at the time. If hay, and one or more years' pasture in the alternate husbandry be intended, those kinds which yield the greatest bulk of produce and come soonest to perfection are to be preferred, as rye-grass, timothy, cocksfoot, and the clovers. If permanent pasture, those are to be added which further insure the advantage of an early and close sward, and a succession of fresh herbage throughout the year, as meadow foxtail, several of the fescues, meadow grass, &c. The whole family of the graminiæ being what may be called gregarious in their habits—thriving better in company than alone—a variety of species is the surest way to obtain a maximum of produce. All land has a tendency to re produce those plants which are indigenous to it; so that after a series of years, more or less, according to the care which has been bestowed upon its cultivation, the indigenous plants will ultimately supersede those which have been artificially sown; but if we can at once produce the varieties naturally suited to the soil, especially those preferred by animals, by filling the ground with a proper proportion of their seeds, a point will be gained calculated to enhance the value of our pasture land, without having to wait nature's time.

Although, in Great Britain, we possess about 500 graminiæ, we only culti-

vate about *five*, and in some parts only one species—namely, rye-grass. Linnæus remarks, that, out of about 900 plants, the cow eats 286 ; the goat 458 ; the sheep 417 ; the horse 278 ; the hog 107 ; the cow refuses 184 of them ; the goat 92 ; the sheep 102 ; the horse 207, and the hog 190 ; and he further remarks, that those rejected by some are highly relished by others. Under these circumstances, why should the farmer prefer only white clover and rye-grass for pasture, in enclosed fields, into which the live stock are placed, and compelled to eat these crops alone, when, by a little care and attention, other varieties may be sown, tending to preserve the animals in a more healthy state, and producing a more valuable supply for milking and feeding ?

In proof of the theory that many of the natural grasses are preferred by sheep and cattle to rye-grass and clover, Mr. Stirling, of Glenbervie, Stirlingshire, made an experiment by dividing a field into ridges, and sowing every alternate pair with different kinds of seeds. The following spring, sheep were enclosed in the field, and allowed to roam at large. After having the liberty of all the varieties for months, the rye-grass was found almost wholly untouched, while the timothy and some other sorts were cropped to the root; thus proving, to a demonstration, the error of cultivating rye grass only, especially for sheep pasture. Timothy hay is eaten greedily by horses, being sweeter and more nourishing than rye-grass. The crop is also very abundant, four tons per statute acre having been produced at Glenbervie.

The quantity of seed should be regulated according to the nature of the soil, and the object to be attained. The following selection, suggested by experience, exhibits the varieties and proportions most suited for permanent pasture, per statute acre, sown with a crop on *medium soil:*

Perennial rye-grass - - - - -	18 lbs., or $\frac{3}{4}$ bushel.
Timothy - - - - - -	3 "
(H) Meadow fescue - - - - -	4 "
(L) Hard fescue - - - - -	4 "
(H) Meadow foxtail - - - - -	2 "
(L) Cocksfoot - - - - -	3 "
White clover - - - - -	5 "
Red perennial clover - - - - -	3 "
Milfoil - - - - - -	$\frac{1}{2}$ "

When sown without a crop, add about a fourth.

For *light* soil, take one lb. off those marked (H,) and add to those marked (L.)

For *heavy* soil, the contrary.

Italian rye-grass may occasionally be substituted for part of the perennial rye-grass ; it does well in peaty soils.

For alternate husbandry, viz: one year's hay, and one or two years' pasture, per statute acre—

Perennial ryegrass - - - - -	18 lbs., or $\frac{3}{4}$ bushel.
Timothy - - - - - -	3 "
Red clover - - - - - -	5 "
White clover - - - - -	3 "
Yellow clover - - - - -	1 "

If for one year's hay only, use $1\frac{1}{4}$ bushel annual rye-grass ; add 2 lbs. to the red clover, and deduct 2 lbs. from the white ; and the contrary for two

years' pasture. A Scotch acre requires one fourth part more, and an Irish acre fully a half, or a half and an eighth-part more than a statute acre.

III.—*Sowing*.

The regular distribution of the seed is of great importance; for this purpose there is nothing equal to a machine, which can also be used in windy weather. Sowing a variety in mixture with the hand requires considerable dexterity; and, indeed, the work can scarcely be done in that way correctly. Sowing the light separately from the heavy seeds is considered a good practice. It has been recommended to sow first the large and then the small seeds, giving them proportionate degrees of covering; but as the large will do equally well, with that degree of covering which will not be too deep for the small, this appears unnecessary. Calm weather should always be selected, if possible, for sowing grass seeds; and should the weather be wet at the time of harrowing or rolling, a quantity of seeds may be expected to be wasted, by adhering to the roller and harrows. The period of sowing must be regulated by the seed time of the crops with which they are sown, or, if without a crop, any time from March till September.

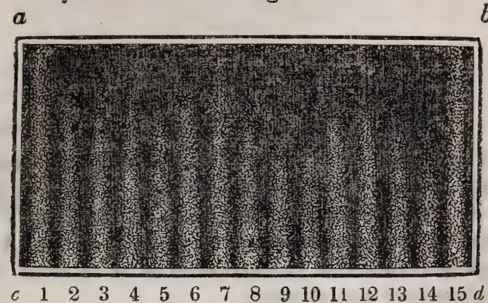
IV.—*Covering*.

In horticulture, it is well known as a general rule, that different seeds require a scale or degree of covering proportionate to their strength and size; yet in agriculture a practice exists till this day much the same, as if the gardener were to sow mignionette in the drills made for peas, or turnip in the dibble hole intended for potatoes; for, by the use of the common sized harrow, a great portion of the grass seeds are as effectually buried as the mignionette and turnip would be. The short-teethed light grass harrow is an improvement, but still too coarse. A harrow formed of *thorn bushes* comes nearer the point, but is inconvenient, and cannot at all times be procured of the right sort. Mr. Smith, of Deanston, having turned his attention to the subject, has supplied the *desideratum* by the invention of his chain-web harrow, which gives the required slight and equal covering in a manner difficult to surpass; for, besides covering the grass seeds effectually, it, from its nature, compresses the surface of the soil to a greater depth than does the roller, and leaves the ground in that state which is so favorable to the growth of grass. This harrow is also valuable for drawing over wheat lands in spring, when the surface has become battered with rains; being constructed on principles which admit of self-adjustment to the surface of the soil, it is, instead of teeth, furnished with numerous little sharp discs, which, revolving, cut or mince, without tearing the plant or turning the clod; for same reasons, it is also well adapted for harrowing top-dressing.

Mr. Stirling, of Glenbervie, who has, in the most practical way, been for several years proving the merits of the different grasses and best method of cultivation, suggested a trial of the most useful of these seeds at various depths, in regular gradation. The following experiment was conducted under our own superintendence in the nursery grounds at Coney Park:

Seeds sown 13th of May, 1842, on an open border of light sandy soil, the covering regulated by a frame standing 3 inches in depth at *a b*, and level with the surface at *c d*—the border 4 feet wide. The white spots

show where the seeds have brairded, and the proportionate thickness of the plants at the different depths, thus proving, to a certainty, the great loss sustained by the ordinary mode of covering the seeds.



No. 1, perennial rye-grass ; 2, timothy ; 3, meadow fescue ; 4, red clover ; 5, white clover ; 6, yellow clover ; 7, rib grass ; 8, meadow foxtail ; 9, hard fescue ; 10, smooth-stalked meadow grass ; 11, cocksfoot ; 12, crested dogstail ; 13, wood-meadow grass ; 14, fiorin ; 15, Italian rye-grass.

The perennial rye-grass alone has grown at 3 inches depth, but after passing the middle or $1\frac{1}{2}$ inch, the plants decrease more than half.

This experiment was repeated in September, on clay soil, when the results were found much the same. The weather was dry ; in wet weather, the probability is, that they would not have vegetated at so great a depth as in the light soil.

Immediately after sowing, weather permitting, the roller should be again used, as nothing seems more clearly established than that grasses thrive best on a firm consolidated surface, as will be seen by the superior growth and appearance of head or end ridges, where, in laboring the field, the horses have trodden by frequent turnings ; hence, where the seeds are sown with a crop of grain, rolling in autumn after the crop is removed, and also the following spring, is of essential benefit ; and if sown without a crop, frequent rollings during the first and second years will be found to improve the pasture, both in growth and thickness.

In regard to the question, whether grass seeds for permanent pasture should be sown with or without a grain crop, I would say, that where it is an object to have a close sward speedily, or where, from the richness of the soil, apprehensions may be entertained of the grain lodging and injuring the young grass, sow without a crop ; but otherwise there does not appear sufficient compensation for the sacrifice, though, in general, it may be advisable to sow the grain thinner than ordinary.

Stirling, *December*, 1843.

APPENDIX No. 8.

HEMP.

LOUISVILLE, *November* 7, 1845.

DEAR SIR: I received your letter of 31st ultimo on yesterday. I cheerfully comply with your request, as far as I can, to furnish you with statistical information in relation to the culture and manufacture of hemp.

I know nothing as to the culture of hemp east of the Alleghany mountains; but I suppose it to be so inconsiderable as to be of no importance in a report of the character you suggest.

I put down the following in round sums as the product of the few western States where it is chiefly grown—viz:

Kentucky in 1844*	22,500	tons.
Missouri in 1844	12,500	
Tennessee in 1844	1 500	
Ohio, Indiana, and Illinois in 1844	500	
	37,000	

Which is thus consumed:

Kentucky, for bagging and bale rope	15,000	tons.
Tennessee, for bagging and bale rope	1,500	
Missouri, for bagging and bale rope	4,500	
Ohio, Illinois, and Indiana, for bagging and bale rope	1,000	
Into bagging and bale rope	22,000	
Consumption of the various towns on the Ohio river, for cordage, lines, twine, &c., say	1,500	
Exported to the eastern cities, say	5,000	
Exported to Europe	100	
Unsold in the hands of farmers	8,400	
Thus exhibiting a surplus product of	37,000	

The experiments made of sending hemp to Europe did not succeed—netting the shippers but about $40 per ton. This is caused, in part, by the heavy expenses consequent upon the shipment and sale; but mainly because it comes into competition with Riga Rein hemp, which can be afforded in England at $140 to $150 per ton of our currency, because England levies only a nominal duty of five shillings per ton on it. This hemp is worth intrinsically $60 to $70 per ton more than Kentucky or Missouri dew-rotted hemp, for cordage, &c., which reduces the market value of the latter there far below what it is worth in the United States.

Very many farmers have made the experiment of water-rotting; but owing to bad success in watering, and worse success in selling, they have

---

* Believed to be for 1845.

nearly abandoned it. None of those who grow hemp largely will water-rot; it is only those who have not slaves, and who grow but a few acres, who will water-rot.

That sent to the eastern cities is used chiefly in the manufacture of cordage, lines, twine, &c.

Kentucky manufactures of bagging, per annum - -	12,000,000 yds.
Tennessee manufactures of bagging, per annum -	1,000,000
Missouri manufactures of bagging, per annum - -	2,000,000
Ohio and Illinois manufacture of bagging, per annum -	1,000,000
New York, New Jersey, and Louisiana manufacture of bagging, per annum - - - - -	500,000
	16,500,000

Kentucky manufactures of bale rope, per annum			-	12,000,000 lbs.
Tennessee	do	do	do - -	1,500,000
Missouri	do	do	do - -	5,000,000
At the east	do	do	do - -	5,000,000
				23,500,000

This amount of bagging and bale rope is sufficient to cover about 2,600,000 bales of cotton.

The price of hemp, bagging, and bale rope has declined almost in the ratio of their increased production: thus, in 1835, with a crop of 7,000 to 8,000 tons in all the western States, it was \$10 to \$12 per cwt., bagging 35 cents per yard, and rope 12 to 13 cents per pound. In 1840, the product had increased 50 per cent., when the prices were—hemp \$9 per cwt., bagging 25 cents per yard, and rope 10 cents per pound. Since then, under the stimulating influence of the tariff of 1842, the products are four or five times the amount that they were in 1835, and the prices now are \$3 per cwt. for hemp, 8 to 9 cents per yard for bagging, and 3 to 4 cents per pound for bale rope. These prices do not remunerate grower or manufacturer; and, were either compelled to pay 6 per cent. interest on the capital employed, it would be ruinous.

You will observe that I have before stated that there is a surplus of hemp unsold in the hands of farmers of 8,400 tons; besides this, there is a vast quantity of unsettled land in the western country, suitable for hemp growing, which is fast filling up with a hemp-growing population. At present we consume more than half of the hemp that is grown, in the manufacture of bagging and bale rope; which cannot be increased, unless by increase of the cotton crop, the very low price of which would indicate that it cannot and will not be increased. The whole amount of the crop of hemp of the western States, that is consumed in the manufacture of cordage, lines, &c., is about 6,000 tons. What is to be done with the present and annually increasing surplus? Europe, we see, will not buy of us at remunerating prices.

If the growers would water-rot, and our naval and commercial marine be supplied wholly with it, there would be no difficulty. But how is this to be effected? But in one way: government must set the example in its use, and should not only establish agencies in the west for its purchase in the raw state, but should establish factories to make the cordage—say one in

this place and one in St. Louis; these two points, by direct water communication, would be easily accessible to all the hemp-growing region. Here all the tow could readily be sold to bagging and rope manufacturers; for such is the improvement in machinery, that tow can now be more cheaply manufactured into bagging than best hemp could be five years ago. A majority of the farmers would water-rot portions of their crop, if they had a market at home for it, where they could be assured of obtaining $120 per ton; which, you are aware, is $60 to $80 per ton less than is paid for Russian hemp. The cordage can be manufactured here as cheap as at the east, and the cost of transportation to *any* port of the United States would not exceed $20 per ton; but the farmers will not water-rot so long as ninety-nine hundreths of them are ignorant of the modus operandi; nor while the market is so distant from them as Boston, &c., and while the inspection is uncertain, and returns more uncertain.

Your letter did not invite the last paragraph; but I hope you will not consider it obtrusive, and also superfluous, inasmuch as your position brings you in contact with every matter or thing for the promotion of the interests of the artisan and agriculturist.

If what I have written should be of any service to you, as a small mite, in making such a report as will develop the resources of this great country, and be the means of enlightening our law-makers and pointing them to some interests which need encouragement, I shall be amply compensated for the few minutes I have expended.

Very respectfully, your obedient servant,

THOS. S. FORMAN.

EDMUND BURKE, Esq.,
Commissioner of Patents, Washington, D. C.

P. S.—It is perhaps proper to say that I have been a grower and manufacturer of hemp for fifteen years.

USEFUL METHOD OF ROTTING FLAX AND HEMP.

[Translated from the Polytechnic Archiv, Berlin, 1841, by E. Goodrich Smith.]

Dr. Scheidtweiler, professor of Botany in Brussels, has introduced the following mode of rotting, which is much recommended: A wooden box, six feet long, broad, and high, and therefore containing two hundred and sixteen cubic feet, has over its bottom a second floor, five to six inches above the lower one; this upper one is perforated with holes; a hole is also made in one side of the box close above the lower bottom, which is stopped up with a bung, in order to let off the water which may be produced in the course of rotting. Upon the upper perforated floor let there be a layer of straw three to four inches thick; on the straw the flax or hemp is to be spread as uniformly and closely as possible, to fill as much as three-fourths of the depth of the box.

When the flax has been spread, then place again a layer of straw of the same thickness as the former, (three to four inches.) Now let the box be filled with river, or, what is better, rain-water, and cover the whole with a top, likewise perforated with holes.

According to the temperature and the degree of dryness of the flax, allow it to soak for from twenty-four to forty-eight hours; then open the bung-hole in the bottom, and draw off the water, and let the flax be trodden down close together with the feet.

When thus trodden down and covered with a layer of straw, the flax, according to the degree of warmth of the atmosphere, will more or less soon become rotted; and, in this method of rotting, it is of the utmost importance so to conduct the rotting that the interior heat shall never rise above from 30° to 36° Reaumur—about 134° to 162° Fahrenheit. On the first day the heat inside the box rises not above the surrounding atmosphere. The day after, it reaches to 20° R., (or 90° Fah.,) and gradually increases up to 70° R., (or nearly 320° Fah.,) on which account the precaution must be taken of pouring in a dozen or more pails of cold water, according to the quantity of flax in the box. If the whole apparatus is placed in a warm place and protected from the cold winds, then cooling it off twice in twenty-four hours is sufficient; but if it is already cool, then once cooling with water is enough, in the same time. In this we must be governed by the thermometer, which is tried in the midst of the layer of flax, and the heat must not be allowed to exceed 36° Reaumur, (or 162° Fahrenheit;) over 40° R., (or about 180° Fahrenheit,) the flax is in danger of being spoilt. On the third day take out some stalks for trial, and see whether the flax has rotted to that usual degree in which the fibre is stripped off.

To aid the process, place four or five inches of wood ashes on the upper layer of straw, on which gradually, and in small quantities, pour water; the ley from the ashes will then fully act on the gummy parts, without attacking the fibre. Finally pour on again some pailsful of water; let it be drawn off; take out the flax from the box; wash and dry it, either in the air or a gentle heat of an oven. The use of ashes is not necessary, but the fibre will be better cleansed, and contain less tow. If, on drawing the stalk through the fingers, it shows itself still of a greenish color and glutinous, the rotting is not complete, and the flax must remain in the box a day longer.

If we employ the ley on the second day, the rotting will be aided. The rotting can be carried on during the whole year, if there be a drying room or an oven. As the process occupies only three or four days, all the flax cultivators can use the same apparatus, and thus avoid the injurious and unhealthy consequences of the usual mode; a single proprietor of such an apparatus could do the rotting for a whole township. By practice, the process may be yet more perfect, and the loss in tow, &c., lessened.

LA FRANCE INDUSTRIELLE.

From the same, page 160.

MACHINE FOR PREPARATION OF FLAX, &c.

According to the transactions of the Industrial Union for the kingdom of Hanover, a Holstein farmer has invented and constructed a machine of wood, by means of which, he states, he can clean flax merely dried in the sun, without any rotting, as it is called, or having undergone any chemical preparation, so perfectly, in twenty-four to twenty-eight hours, that it far

excels the threads of flax which are derived from the usual process. The machine, too, whether of wood or iron, is so cheap that any farmer can purchase one. It also prepares a large quantity rapidly, and can be worked by a child ten years old. The specimens of flax prepared by this machine, submitted to the Union in Hanover, were of extraordinary cleanness, strength, and fineness.

WATER ROTTING HEMP.

The subjoined article we find in the Nashville Agriculturist, from the pen of Gen. G. J. Pillow.

I have water-rotted a crop of forty acres of last year's growth, and have not made a single failure; nor have I had any difficulty in determining the point at which the rotting process should cease; nor have my hands been at all exposed; neither is there the least danger to be apprehended of sickness from this kind of labor. But I believe my success is mainly attributable to the construction of my vat, and my preparation for the business. I will first state the character of these: My vat is built near a small creek, which I straightened by a ditch, and thereby gave it a deep channel. The vat is 90 feet long, 20 feet wide, and 4 feet deep. Its walls are built of hard brick, laid in hydraulic cement mortar, and they rest upon a solid stone, which extends clear over the bottom of the vat. The walls of the vat are thus made water-tight, and proof against the action of the water.

To dispense with the immense weight which would be required to press the hemp down, I drilled holes in the stone bottom, along the whole length of the vat on both sides, and within two feet of the walls, the holes being eight feet apart; into these holes I drove iron bolts, with wedges of the same material inserted in the lower ends, as firmly as I could with a sledge-hammer. The upper ends of these bolts have each a closed hook or ring, into which are hooked iron bolts $4\frac{1}{2}$ feet long, with key-holes in the upper ends.

When my vat is filled with hemp, I place cedar logs across the whole width ofthe vat. The upper bolts pass through the ends of these logs, and, with iron keys, the whole are clamped firmly to the rock bottom.

This being done, by the use of a water gate across the small creek spoken of above, the water is raised in height equal to the top of my vat, and it then passes through wooden pipes, of $4\frac{1}{2}$ inches hole, into the vat, and fills it in about three hours. In drawing the water off from the vat, I raise a small water gate which slides in a casting on the inside of a frame, worked into the wall, and the water thence passes rapidly through a ditch, constructed for the purpose, into the main creek. The vat may in this way be emptied in half an hour.

It will thus be seen that with five minutes' labor my vat may be emptied or filled. Within 20 steps of this vat are built my hemp house, the house for my machinery, and a very large shelter to protect my hemp from exposure to the weather, all under one roof.

By having my hemp always protected from the weather, I can carry on any department of the labor without any interruption from rain or inclement weather. In addition to this consideration, (which is very important,) I save a heavy loss which is always incurred by stacking hemp, and I pro-

tect my hemp from the deleterious effects of the weather upon the color, weight, strength, and oily qualities of the lint. In this last point of view, the shelter is indispensable.

Inasmuch as that, in water rotting hemp, it has to be handled a great deal, it is very important to *cut* instead of *pull* the hemp. It is equally important to the after labor to handle it so as not to *break* the stalks nor *tangle* it; but care should be used to lay it down as straight as possible. If this is not attended to, the subsequent labor is greatly more difficult, and the loss from the broken stalks and tangled hemp is much increased.

After the hemp has become wilted by exposure to the sun for half a day, (and, after such exposure, care should be taken to avoid rain or a second night's dew,) it should be taken up and bound in bundles six or eight inches in diameter, and loosely shocked in the field for 24 or 30 hours, so as to dry the tops and leaves, and prevent the hemp from mouldering under the shelter. It should then be removed and packed away under the shelter. It would be preferable (if there were time sufficient) to top the hemp before sheltering it. The only additional preparation necessary, before placing it in the vat, is to top the hemp, bringing it to a uniform length, and placing around each bundle another bind near the upper end, having previously pressed the first bind towards the lower end of the bundle. I have not found it necessary to introduce a stick into the bundle, to support the hemp in lifting it out of the vat; nor do I believe it will ever be necessary, if the vat is so constructed as to draw off the water previous to removing the hemp.

After taking the hemp out of the vat, for the purpose of drying it, it should be opened, and spread against something which will support it in an erect or inclined position, and keep it off the ground. If suffered to come in contact with the ground, the dirt adheres to it, and will in some degree injure the beauty and whiteness of the lint, and make the process of breaking and cleaning it more difficult and unpleasant.

The length of time required to rot hemp in water depends very much upon the quality of the hemp, and the character of the weather. The large and coarse hemp will rot much quicker than will the small or fine hemp. Care should therefore be taken to bind the small hemp by itself, and not to place the coarse and fine hemp in the vat at the same time.

If the weather is warm, and the same water retained, ordinary hemp will rot in from six to ten days. If the water is frequently drawn off, and pure and fresh water supplied every day or two, it will require two or three days longer; but in the latter case the hemp will be much cleaner, and brighter, and softer, and it will lose less in preparing it for the manufacturer, than if kept all the time in the same water.

After the hemp has been perfectly dried, it should be tied in bundles again, and removed to the shelter, where it will remain free from damage until it suits to apply it to the brake. After taking it from the brake, it should be run through the hatchel, so as to straighten the fibre and extract the tow from it. The hemp which remains is most beautiful, surpassing in brightness, length, strength, and glossy appearance, any hemp I have ever seen. The tow which is thrown off from the brake is less in quantity and superior in quality to the tow from the hand brake. This tow, as also the tow extracted by the hatchel, I straighten by again running it through the brake, (by which process it is cleaned almost perfectly of the sheaves,) and sell to our home manufacturers for making rope and baling. Care should

be used, after hatcheling the hemp, to keep the butt ends of the lint all together, and to keep them all as even as possible. Being thus handled, will contribute greatly to the ease with which it can be handled and separated by the manufacturers, without its becoming tangled; whereas negligently and carelessly putting it up, by mixing the tops and butts of the lint together, will very materially detract from its value in the market. In this latter condition it will not be received at all at the navy yard of the government. Being hatcheled and thus arranged, it should be bound tightly around the butt ends of the lint, in bundles of 8 inches in diameter, and in that condition baled up, without being twisted at all. In baling, the ends of the lint may be doubled over so as to make the bales of proper length. The hemp should all be assorted—that is, the long hemp should be bound and baled by itself, and so of the shorter quality. In order to protect the lint from dirt, and the consequences of roughly handling during transportation to market, its whole outer surface should be covered with ordinary baling of other canvass.

WASHINGTON CITY, *January* 8, 1844.

SIR: The following treatise on the culture of hemp, and water-rotting, is submitted to the farmers of Missouri and the adjoining States:

The land best adapted to the culture of hemp is that which has been timbered with black walnut, buckeye, hackberry, and a reasonable proportion of white oak; or rich bottom lands answer well. The land should be ploughed deep, and well harrowed before seeding. If sod land, it should be ploughed down in the fall, to receive the winter frosts; and when time for seeding, (which is from the 1st of April to the 10th of May,) it should be well ploughed, harrowed, levelled, and smoothed. The seed should be sown broadcast, one bushel and a half to the acre. When the blossoms begin to fall, (which is from the middle of July to the 1st of August,) it should then be cut. Hemp left standing too long injures the staple, and produces a harshness and weakness. It should be cut before it is ripe, which is before the blossoms begin to fall. By attending to this, particularly, you will find the lint heavier, as it will retain its oily substance, (what is termed the essential oil,) which, by being left standing until ripe, the action of the atmosphere, as it ripens, causes to leave it, which produces a lightness and harshness in the lint, and deprives it, in a certain degree, of its elasticity; consequently, when the hemp is applied to the hatchel, the staple breaks into small fibres, which are converted into tow; and when the tar is applied to it, and converted into cordage, it becomes stubborn and brittle in frosty weather, and consequently not so durable. Any chemical process, or any other mode to produce a rapid solution of the gum, extracts the oil, weakens the staple, and produces the former injurious effects.

The instrument for cutting is similar to the point of an ordinary scythe; it is about two feet long from the point, with a socket standing at right angles with the face of the blade, and angling to the edge, to prevent the person, when cutting, from bending too much, as it is necessary for him to stand upright as much as possible to keep the hemp from tangling. The hemp should be cut as close to the ground as possible, and, for watering, it should have the tops cut off as far as the seed ends, and thrown into the shade or kiln-dried. The drying in the shade retains its natural color, and

causes the essential oil to be retained. The kiln-drying has the same effect, but is a more rapid process. The sun produces a harshness when rotted, and the dew discolors it and produces less weight. Pulling hemp is not recommendable; it injures the soil as well as the quality of the hemp—more particularly that of water-rotted. When cutting, all the large hemp should be laid by itself; it should be bound up into bundles, with two bands on them, about the size of six or eight inches through in the butts. When too large, they are awkward to handle, which wastes the hemp. Also, place sticks in the centre of each bundle, about one inch in thickness or more; it prevents the hemp from breaking and tangling when rotted, and will assist to facilitate the workmen in handling it: the same sticks will answer for a whole crop. If your pools are prepared, commence filling them; and be particular in selecting the size of hemp, placing the large in a pool by itself, and the small also in a pool by itself, as the large undergoes a more rapid solution when immersed. The hemp placed in the pools should be carefully packed down with narrow plank laid on the points and butts, and with rock or timber to weigh it down; rock is preferable.

No hemp less than five feet should be water-rotted. Sizes under this may be dew-rotted. It depends upon the temperature of the weather in what length of time it produces maceration. In the month of August, it takes four or five days; September, six to eight; October, ten to twelve; December, three or four weeks. After the fourth or fifth day in August and September, the sixth or eighth day in October and November, and the third week in December, or less time, it should be carefully examined, to ascertain when it has fully come to its solution. You will discover that the stalk has a roughness on the surface previous to its being placed in the pools. When the solution has arrived to its extent, by drawing a few stalks out of the bundles in the centre, promiscuously, and passing your hand along the stalk, you will find the roughness has left it, and that it is smooth to the touch. The hemp is then finished; take it out immediately; spread it on the ground; and when perfectly dry on one side, turn it over for the other—say for two or three times—until you find that the pith has hardened. If it should receive several rains, it does not injure, provided you attend to turning it. The rains wash off the gum which lies on the surface of the lint; and when applied to the break, it produces a clearer staple, cleans easier, and makes less tow.

There is also another mode, when the stalk will break off short, and free itself of the lint; but the former is the most certain. The hemp, as it is dried, should be thrown into shocks or ricks, well secured from the weather penetrating their centres. If the weather penetrates the centre, it will injure the staple by reducing its strength. In breaking the hemp, it should be broke in small hands, about one-third of the ordinary size. In all my experience I find our hemp requires to be properly hatcheled to stand the test the government requires. This is entirely owing to the different mode of handling to Russia hemp; but by breaking in small hands, it relieves itself of sheaves, and produces less tow, and comes nearer to the quality of Russia Riga Rein, which quality of hemp the government uses for the navy. It should not be applied to the break too often, nor the breakers suffered to practise the habit of breaking dew-rotted hemp, by beating it over the break to relieve it of the herds. It should be thrown up loosely into the atmosphere to let the air pass through it. In drawing your hemp, you should draw it from each end, so that the staple will draw clear, and

have an even hand. See particularly that the butts of the staple be even, and that all the drawings be handed to itself, and not placed in the prime hemp, as it is the habit of doing in dew-rotted. All hemp with the drawings secreted in the centre will not pass inspection. The hemp must be perfectly clear of sheaves, and that must be effected not by little breaking and beating across the break, but by plenty of shaking. I have had the strongest evidence, in all my operations, that hemp broke in small hands, say 10 or 12 stalks at a time, will yield less tow in hatcheling by 20 to 30 per cent., if the hemp is properly rotted. Also scutcheling helps the hemp greatly, and causes it to yield less tow, and straightens out the staple.

This process is very indispensable to produce a merchantable article. The instrument for scutcheling is a flat wooden or iron knife, in the form of a paddle. The hemp is placed on a board upright, about four feet long; one half of the length of the hemp is held by the left hand at the top of the board, and the right applies the knife, which, when properly applied, relieves the hemp of the small sheaves which adhere to it, and straightens the staple for the hatchel, which adds greatly to the value of the article, and consequently produces less tow.

If the farmers have a desire to arrive at that stage in their staple to be equal to Russia, it is indispensable for them to adhere to these instructions. There is no more labor attending water rotted hemp, if properly prepared for operation, than dew-rotted. Hemp water-rotted judiciously, and handled properly, will gain from ten to fifteen pounds on the hundred above the dew-rotted, which more than amply pays for the difference of labor or expense in preparation. This has been proven to be the fact by those who have tested it at one of my pools in Kentucky, and also by an experienced farmer in Missouri. Hemp that is darkened by the dews, or colored water, which is produced by the blackness of the soil, will not meet with a favorable demand in the eastern market; it partakes of the character and price of dew-rotted hemp. To avoid this, immediately after your hemp is cut, place it under shelter, or shield it with inferior hemp, that the dews or rains will not affect it; and also let your pools be made of plank, or otherwise place them at the side of the stream, and dam it sufficient in height that, in case the stream should be disturbed by rain or freshet, it does not pass through your pool.

The construction of pools is as follows: Small spring branches dug down two or three feet; a levee thrown up around them, and small flood-gates at each end, made simply out of four pieces of boards a foot wide, and two feet long. A waste gate around them to let the water pass around, and not into the pool; if so, it produces an uneven temperature of the water, and the hemp becomes irregular in its solution. The pools can be made of plank, and the water pumped into them supplied through a small leaden pipe by an ordinary lifting pump. A pool 40 by 60 feet, 2½ feet deep, will receive three to four acres of ordinary hemp. The pool must not be over 3 feet deep; it will produce an irregular solution, owing to the uneven temperature of the water. To water-rot in ponds or large streams is not so commendable, particularly running streams. The hemp becomes irregular in its solution, and loses its lint. The preparation necessary is to have two long saplings; pin them at each end with cross bars, forming a raft, with uprights at each end; their length to be the depth of the water. These form a raft, say 20 or 30 feet long; load your hemp on them, and sink them with rock. For the conveyance of water to and from your pools, I

will call your attention to the leaden pipes manufactured in this city by Mr. W. W. Thompson. These pipes will be a great acquisition for this purpose, as also for watering stock and avoiding waste of water. They can be made any length, and at a much cheaper rate than an ordinary spout. To those farmers who are not in possession of springs, they can fix a small lifting pump in any part of their farm, and supply their vats with water.

As regards the process, there need not be the slightest apprehension as to deleterious effects to health. As a demonstration of this fact, in my operations for the government, I had about 200 men at various pools in the hemp-growing region in Kentucky, from 1840 to 1841, in a circuit of 100 miles, and there was not one instance of sickness, although many of the men exposed themselves to the water when it was not necessary. I also advise gentlemen not to attempt to deliver more than one ton of hemp to each laborer they have, and not to exceed from 5 to 10 tons the season; beyond this, it will produce difficulties.

I will also observe the necessity of watching your hemp closely when near the time of its full solution. If you permit it to have too much rot, it will injure the hemp seriously in strength and in weight; and to avoid this to those that are not particularly acquainted with its proper solution, they may take it out before it is carried too far, and spread it down upon the field for the dews and rains to finish; but at the time, be particular to attend to turning it, that it may receive an equal proportion of dews and rains throughout. Hemp rotted in the spring is not of as good quality as that rotted in the fall—say the months of October, November, and December. The spring rot produces a lightness of color, and the staple is weakened and loses much in weight. This is produced by the state of the atmosphere, and the sudden and extreme changes of it; and also the hemp lying in the stack after being a long time cut, undergoes what is termed a sweat, which changes the state of the staple. In all the hemp-growing regions of Russia, the crops amount yearly to 90,000 tons. The best hemp produced is in the government of Cheiringoff. The hemp is mostly of short staple, and of the very best quality—the produce is about 15,000 tons yearly; and in part of the government of Orel short staple is also produced, and carried to the port of Riga; but the greater part of the hemp produced in this government is long staple, of which the produce is about 14,000 tons. The hemp of Koursk is mostly long staple, and the produce is about 13,000 tons. The hemp of the government of Tooler is also long staple, and produces about 8,000 tons. In the governments of Tamboff and Riazan, the produce is about 14,000 tons, but not of good quality, being more after the color of flax, and its staple is weak; it is chiefly produced for the Archangel market, and a portion of it reaches St. Petersburgh. The hemp grown in the government of Smolenski is of short staple, partakes of the character of that produced in the governments of Tamboff and Riazan, and which is mostly manufactured into sail cloth fabrics; the produce is about 8,000 tons. The government of Calonga produces about 7,000 tons, mostly short staple. The Russian mode practised in preparing their hemp differs only with their instruction in relation to the care and pains taken in preparation. A portion of the country also adopts a chemical process to produce a rapid solution of the gum, which is injurious to the staple. As this country is subject to frequent hail storms, the crops oftentimes fall short of this.

In laying this information before you, my object is to convey to you the

quantity and the various qualities of hemp produced in the hemp-growing regions of Russia. You will also notice that we have a decided advantage over the Russian article in comparing the small quantity of long staple to ours, as all our hemp generally is of long staple; therefore, by assiduous attention to the culture and preparing of it, our staple must and will have the ascendancy in the European market. In a reasonable time, Missouri can supply the whole world with hemp; as well must Illinois and Iowa arrive to be extensive hemp-growing States, and of a superior quality. And let the agricultural interest of these States buckle on their energies and industry, and consummate it, to the advancement of their own prosperity and the country in general.

I have had the assurance recently given me from a gentleman direct from London, of the highest standing in mercantile transactions, that the moment we are prepared, he will effect a contract to supply the British government with our hemp for the navy, which consumes equal to our navy, and our commercial enterprise—about 12,000 tons yearly. Also the consumption of the port of London is 20,000 tons yearly, embracing the requirements of the navy. I have also had the assurance, from a gentleman of high standing in commercial transactions in France, that, from the character of our hemp, the moment the country is prepared, he will effect the supplying of the French navy with our staple. These countries are desirous to encourage us, that they may have two markets to flee to in case of any warlike disturbance.

I have labored hard, with great sacrifices of interest, for these four years, with the pleasing and proud anticipation to see the country independent of this foreign staple, and that we may become heavy exporters; and the day is not far distant when these anticipations will be fully realized.

And to facilitate this most important object, I have, by the solicitations of a number of gentlemen, delegates from the west, and others in power at this city, consented to embark upon this arduous and hazardous undertaking, with the view of supplying the navy with American water-rotted hemp from the west for a term of years. I do assure you, gentlemen, that no pecuniary inducement could have influenced me to embark upon this work of enterprise again. But something must be done to keep alive and finish this great work, which has been commenced and is in progress, to its ultimate accomplishment. I have lost a large fortune in establishing the practicability of it, and have undergone great afflictions; in consequence of which, I have felt reluctance to subject myself to a second trial of the various circumstances which befel me in effecting that important object. But, with a desire to promote *the agricultural interest of the west, and to see my country speedily independent of this foreign staple*, and with the confidence that I have in you, that you will support me in this act of enterprise, I now come forward once more, with all my resources and energy, to give this subject additional impetus, that will convince the world that this republic can stand free and independent, and can supply the commercial world. To accomplish this great work, I lean upon you, *the farmers of the west*, to rally to my aid, and give me your prompt and energetic co-operation. *And to you, enterprising eastern men, I invite you west*, to establish your ingenuity and enterprise in machinery for the manufacture of fabrics. Your interest, farmers, your prosperity, and your duty as patriots, and as an example to the rising generation, demand your prompt and undeviating attention to this important subject. * * * The question no

doubt will arise in your mind, how is all this to be accomplished? I will answer briefly. Let every farmer take four acres of his best land, sow it down in hemp, and follow my instructions laid before you to the letter. If you have not water convenient, build plank vats 25 feet by 14 and 2½ deep; pump the water into them when the hemp is laid in. They require but a small quantity of water; two men can pump sufficient water in a day, and the same water, with a small portion of additional fresh added to it if necessary, will answer for two or three rottings. This size vat will answer for a crop of 25 or 30 acres, which is more than one farmer should undertake the first year. Four acres of good ordinary hemp, judiciously rotted, properly cleaned, scutcheled, hatcheled, and well prepared, will yield to the farmer a clear gain of all expense of $150 or more. What can be a greater encouragement in an agricultural pursuit than this? In addition to this, a steady market, with the assurances that if you produce a prime article, the highest cash price is ready for you according to its quality, delivered at the various points of agencies. Those persons wishing to see me can address me at St. Louis, post paid. I will either wait upon them personally, or answer them from any State that feels a desire to embark in this enterprise. I am candid to inform those that have never water-rotted, that there is more labor attending this operation than they imagine. But do not be discouraged; experience and time will overcome it in a very great degree; with perseverrance and industrious attention, not relying upon the care and attention of your negroes and laborers, but by your own close attention, you will see great advantages to be gained in the prosecution of this business. I can with confidence and in truth say, that with practical experience and perseveance, they will be found worth more than all the theory and negroes in existence, in the saving of labor, expense, and the quality of the article produced. They will overcome difficulties and objections which first present themselves to you in its incipiency, which finally become obstacles of *minor consideration.* Therefore be not deterred when they are met; but persevere and acquaint yourself of the most practical and economical manner to exercise in the water-rotting process. My plans are laid before you; practise them, and you will improve on them. Practice makes perfect, and opens to you advantages that can be applied to great improvements and economy.

Hemp for the navy must not be less than four and a half feet in length, a clear staple, of proper and natural strength, preserved by judicious treatment, and of a bright color; dark hemp will not be received for that purpose. It will be received and appropriated for commercial enterprise, at a reduced price.

It is the desire that the farmer will practise the mode of scutcheling to relieve the hemp of the herds, in the place of applying it so often to the break. It straightens out the staple, and produces much less tow when applied to the hatchel. Also that they should become familiar with hatcheling of hemp generally. It adds greatly to the character of the hemp, east and abroad. And to those that wish to purchase hatchels, they can be obtained at St. Louis for five to six dollars; or any ordinary blacksmiths can make them, provided they understand setting the teeth, (it greatly depends upon this.) If the teeth are not properly set, it will split and derange the staple and produce much tow. All hemp delivered unhatcheled will be received and paid for according to quality. It has been the practice to

use great deception in the preparation of this article, by secreting the drawings and sheaves in the centre of the heads. But it will be useless to attempt this, as they are sure of being detected.

There are four classes of Russia hemp—Riga Rein, clean St. Petersburgh, half clean, and out-shot. And it is the intention to classify our hemp to the same, and the price paid will range up to eight dollars per one hundred and twelve pounds, delivered at St. Louis, for that quality of hemp that will stand the test that the government requires. And that can be effected and produced by judicious rotting, scutcheling, hatcheling, and of a proper length. That the hemp may be inspected and selected without prejudice to either party, there will be honest competent men from the east, who are fully acquainted with the qualities of Russia hemp, and more particularly that article the government requires, whose hands it is to pass through before it will be paid for.

I conclude this subject with a conviction that this appeal will not be in vain, and that in three years the foreign article will be entirely excluded from our ports, and heavy exports made to Europe.

And I will impress upon your minds the importance of adhering to these instructions; and when your hemp is ready for market, by calling upon Messrs. W. W. Thompson & Co., of St. Louis, or the subscriber, you can obtain any information in regard to the final disposition.

DAVID MYERLE.

St. Louis, *Missouri.*

HEMP.

One of the editors of the Louisville Journal, now in Boston, writes as follows in relation to the increased consumption of American hemp:

"I find that the consumption of hemp at Boston and New York has increased marvellously since last summer. An extensive establishment at Plymouth has manufactured twenty five gangs of rigging this year of American hemp, and but six of Russia, whereas last year it manufactured not a single gang out of American hemp. The American dew-rotted hemp is now used almost universally for standing rigging, and it is getting fast into use for running rigging. Sales are now making here, at six months, of a good article of dew-rotted at $100, the range being from $90 to $100. Some lots have been shipped from New Orleans to Boston this summer at less than $3 a ton; but, as freights are now $11 to Louisville, the whole freight amounts at present to $14 a ton. Nothing but this new demand for hemp for naval purposes could have prevented it from sinking to nothing. The foreign demand is also taking off a good deal at present prices, at least for some time.

"Cotton duck has almost entirely superseded Russia for sails. A merchant who formerly imported and sold a large quantity of Russia duck informs me that he has had a lot of it on hand for three years. It is no longer imported, and the demand has nearly entirely ceased. Cotton duck does not handle as well as hempen, but it is more durable and cheaper, and holds the wind as well. It will enjoy the preference until the Kentucky

hemp duck takes the field; then, of course, it will retire, except for small craft in the coasting trade."

From the Prairie Farmer.

HEMP PURCHASES AT THE WEST.

The Louisville and St. Louis papers have complained much, that the instructions of the Navy Department to hemp agents have rendered nugatory the intentions of the law of Congress, providing for the inspection and purchase of hemp, passed September 11, 1841. These instructions have been such as to prohibit entirely the purchase of western and southern hemp, the growing of which, it is claimed, the law was passed to encourage. These instructions are now rescinded, so that the article may be purchased in Louisville and St. Louis instead of Boston. American hemp is declared to be fully equal to the best of foreign, and we are glad to know that obstructions to its production are removed.

TO HEMP GROWERS.

The following letter is from a gentleman who is exceedingly well versed in all matters pertaining both to the culture and manufacture of hemp, and contains some important suggestions, which we think hemp-growers should give heed to. All who have paid any attention to the prices current of New Orleans, New York, and Boston, must have observed that hemp of *light* color has been generally sought for, while that of a *dark* color has been generally neglected:

Franklin House, Louisville, *August* 1, 1845.

To the Editors of the Louisville Journal and Dollar Farmer:

Gentlemen: Having had some experience in the manufacture of hemp in Kentucky, and knowing something of the fluctuations in price and varieties of quality for different purposes and different markets, I venture to make a suggestion to the farmers in the hemp-growing region of Kentucky.

It is known generally that there will be at the end of the present season a very large amount of bagging and rope left over, though the cotton crop this year is expected to be very large. The result will be that sales will be made at ruinous rates, if sales have not been, and are not now, making at those rates. Now, when the new crop of hemp comes in, what can be the expectation of the farmer? We see at once the manufacturers cannot give a price that will pay for raising it. Shall we have another market for it in the North? But that market cannot be beneficial to us, unless the hemp be of a quality and *color* that will suit it. And, in order to have such, the hemp must be managed in the following manner: As soon as the hemp is cured enough after cutting to stack, it should be stacked, if possible, without rain. There let it remain until frost in November, when it may be spread out. This secures the light color which is sought after for the eastern or northern markets. And should one-half the present crop in Kentucky be of that light bright color when ready for market, I

have no hesitation in saying it would meet a demand and price that would greatly benefit the grower. I have no expectation that the price would be much beyond the price the lead-colored hemp would bring from the manufacturer here; but a division of the crop in this way, half at home and half abroad, will insure a demand for the whole crop, be it ever so great.

TO GIVE WATER-ROTTED HEMP A LIGHT COLOR.

The following note, from an eminent citizen fully conversant with the culture and manufacture of hemp, sustains completely the views of a letter which we gave a few weeks ago, and deserves the careful attention of all hemp-growers:

To the Editors of the Louisville Journal:

GENTLEMEN: In 1822 and 1823, Nathaniel Hart, of Woodford county, Kentucky, stacked his hemp of bright color, and kept it in stack sixteen or eighteen months. He spread it out to water in November, and took it up at the usual time in the winter or spring. The result was a beautiful white hemp, having in all respects the appearance of water-rotted hemp, and I believe every way equal to it. Mr. Hart, in 1824, published in the Kentucky Farmer the result of these experiments, and, as an inducement to produce such hemp, offered to purchase it at a high price; yet very little hemp has been so prepared in Kentucky. I saw yesterday, landing from the Blue Wing, four or five tons of such hemp, grown by a Mr. Cowan, of Boyle county, sold by Mr. Bowman on the wharf for one hundred and two dollars per ton. The large crop of hemp now in stack makes the present season a very favorable one for beginning to produce this kind of hemp. I hope some experiments of this kind will be made in Jefferson county of the hemp now in stack.

E. G. M'GINNIS.

LOUISVILLE, *September* 25, 1845.

From the St. Louis New Era.

HEMP.

The following fact was submitted to me (to assign the cause) by the Navy Department:

"The American water-rotted hemp, when made into cordage without the application of tar, proved to be greater in strength than Russian; and the application of tar proved to depreciate its strength to that of Russian."

It is well known that our hemp, properly prepared, is superior in every respect to Russian; and as this subject is one of great interest to the West, as also of great national importance, I feel a deep interest to cherish that fostering care the government is now extending to this branch of agriculture, and will give you my views in regard to obviating this evil; for, if not attended to, it will produce such a prejudice against the use of American hemp for naval purposes, that in time its use will be abandoned.

The Russian method is to select their male hemp from the female, at the

time the pollen begins to fall from the male, and they also harvest the female before it fully matures. By adhering strictly to this method, the hemp retains the *essential oil.* They also kiln-dry it immediately after it is pulled; the object of doing this is to harden the lint and fix the oil, so that, in the process of rotting, the oil will not evaporate; it is essential that the same method be followed by the Americans.

The hemp should be pulled before the stalk or leaves begin to change their color; when that takes place, it is a sure indication of the oil passing into the seed to complete its maturity; consequently, it leaves the lint, when rotted, harsh, and, with the application of tar, depreciates its strength. Not so with the Russian hemp; the essential oil, being retained, acts as a desideratum for the application of tar, and overcomes the evil which is effected by the heated tar and the spirits which remain in it.

The American farmer, to obviate in a partial manner the evil mentioned, should adopt the method of pulling the hemp, as before described, and immediately place it under cover, to avoid the action of the sun and weather, and remain so for a sufficient time for the lint to harden, which will in a certain degree produce the same effect as the Russian process of kiln-drying. By this means the hemp will retain that most important antidote—the essential oil—from the influence of the tar in its heated application.

DAVID MYERLE.

WASHINGTON, *January* 6, 1845.

From the Louisville Courier, May 17.

AMERICAN HEMP.

In the Courier of yesterday morning we stated that we had seen at the store of Messrs. James Anderson & Co.—the office of the Kentucky hemp agency, under the direction of Mr. Lewis Saunders—a number of specimens of American and Russian hemp, and cordage manufactured from them; and also a machine for testing the strength of the cordage. Yesterday experiments were made upon this machine, the interesting results of which we give below, from Mr. Saunders, the agent. It will be seen from the record that the American hemp not only does not suffer by a comparison with the Russian hemp, but that, in the tests of the larger cordage, it sustained a much greater weight than the Russian hemp. These facts are of deep interest to western hemp culturists, and to the entire country. They show conclusively that as good an article (if not better) of water-rotted hemp can be furnished by the farmers of the valley of the Mississippi as can be obtained from Russia, from whence our government heretofore have obtained all their naval supplies of hemp.

We understand that the mode of curing hemp by the Messrs. Anderson is peculiar. It is neither steamed nor water-rotted, but broken from the stack. The samples of their hemp which we saw, cured by their process, were very superior in appearance to the Russian water-rotted, and we believe much stronger.

HEMP AGENCY FOR KENTUCKY,
Louisville, May 16, 1845.

Commodore Morris, head of the Bureau of Construction and Equipment, caused to be sent to the agency a very perfect apparatus for the purpose of testing the quality of hemp; also a box containing Riga Rein hemp, and a box containing American water-rotted hemp, as samples for examination and comparison. The apparatus and samples of hemp were sent from the Boston navy yard, and arrived here in October last. The object of the department is to give information to the growers and dealers of hemp. By these samples and tests, bidders for the supply of the navy can, with more certainty, submit their proposals.

I caused four parcels of hemp to be accurately weighed, of twenty-five pounds each, and delivered to Mr. Till, (a ropemaker of this place, who learned his trade in Boston,) with direction to make up each parcel separate into $1\frac{3}{4}$ inch rope, and into yarns.

No. 1. Twenty-five pounds American water-rotted hemp, sent from the navy-yard, Boston.

No. 2. Twenty-five pounds Riga Rein hemp, sent from the navy-yard, Boston.

No. 3. Twenty-five pounds cured and prepared by Mr. James Anderson of this place, intended for naval purposes.

No. 4. Twenty-five pounds of a good lot of Kentucky dew-rotted hemp.

The waste and tow returned by Mr. Till from No. 1, was eleven pounds; from No. 2, six and a half pounds; from No. 3, six pounds; from No. 4, ten pounds.

A piece of bolt rope, intended for $1\frac{3}{4}$ inch, made of yarns running 26, was put to the test.

No. 1 broke or parted	at 2,705	pounds.
Same of No. 2 broke or parted	at 2,555	do
Same of No. 3 broke or parted	at 2,940	do
of No. 4 (of $1\frac{6}{10}$ inch)	at 2,415	do

Three-thread spun yarn of No. 1, broke at 400 pounds; of No. 2, at 365 pounds; of No. 3, (hard twisted,) at 362 pounds; of No. 4, at 450 pounds.

Marline two-thread—No. 1 broke at 132 pounds; No. 2 broke at 135 pounds; No. 3 (hard twisted) at 112 pounds; No 4 at 155 pounds.

One-thread, yarns running twenty-six—No. 1 broke at 222 pounds; No. 2 (one-thread spun yarn running twenty six) broke at 108 pounds; No. 3 (same) at 140 pounds; No. 4 (same) at 190 pounds.

Further trials and tests may give different results. They will be made and published.

LEWIS SAUNDERS, *Hemp Agent.*

—

From the Union.

PREPARATION OF HEMP.

We have recently published several articles on the making of hemp. We are happy to have the opportunity of laying the following letter before our readers, just received at the Navy Department from its agent in Kentucky, appointed by the present secretary:

HEMP AGENCY OF KENTUCKY,
Louisville, June 6, 1845.

SIR: The day after the date of my last letter, (16th ult.,) I sat out on an excursion to the centre of the hemp district of Kentucky, through the counties of Franklin, Woodford, Fayette, and Bourbon, placing, for examination and comparison, samples of the hemp sent out from the Boston navy yard, at Frankfort, Versailles, Lexington, Paris, and Georgetown. I had intercourse with many of the principal hemp growers, particularly those that were inclined to water-rot their hemp. I was much gratified in finding a strong disposition on their part to water-rot the crop now growing, to which they are impelled by the present very low price of dew-rotted hemp.

Some knowledge has been acquired by the experiment made in the last few years in water-rotting. It has been ascertained that it will not do to water-rot in warm weather—that it must be done in cold weather.

I confidently believe that the government can be supplied with water-rotted hemp hereafter to the amount of its wants.

Messrs. James Anderson & Co., of this city, have been a long time engaged in making experiments in preparing hemp for manufacturing purposes. Mr. James Anderson speaks now with confidence of having succeeded in curing hemp by heat, to supersede all other methods of rotting or curing hemp. His plan is to break the hemp from the stock by a number of rollers; he then passes it through a fermentation caused by heat, leaving it in a condition to prevent any second or succeeding fermentation.

A bale of hemp thus prepared has been sent to Boston, for the purpose of examination, comparison, and testing. The naval officer, Mr. Parmenter, was requested to take charge of this bale, and attend to the experimental trials.

By this day's mail, I have sent to your address two samples of hemp—one nearly or quite the same as sent before; the other *washed* from the same, marked "refined."

The *refined* is brought to its beautiful silky appearance by washing through several washings of alkalies, and then hatcheled.

There is a strong disposition on the part of some capitalists of this city to engage in the manufacturing of sail cloth of every description. I am requested by them to solicit you to cause to be sent to this agency samples of at least one yard in length of each sort of sail cloth used in the navy of the United States, with a description of the weight and length of each bolt, and the separate value of each. If it is agreeable to you to have this suggestion carried out, you will oblige many of the citizens of this place.

Very respectfully, your obedient servant,

LEWIS SAUNDERS.

HEMP AGENCY FOR KENTUCKY,
Louisville, June 9, 1845.

SIR: In a former letter you were informed that I had got possession of the hemp apparatus for testing the strength of hemp. I secured an eligible position for using it, and a convenient office adjoining, for the use of the agency, for the sum of one hundred dollars per annum, to be paid quarterly.

Persons interested in hemp were anxious to witness the operation of the

machine. I had four parcels of hemp spun into bolt rope—No. 1, American water-rotted hemp; No. 2, Riga Rein hemp, (these two were taken from the boxes sent from Boston;) No. 3, Rhodian hemp, (this is a new article, broke and cleaned without being rotted, either by water or dew. After being thoroughly cleaned, it is put into a close, air-tight room, and then heated by steam until it is sufficiently cured. James Anderson, who claims this discovery, is of opinion that it will answer every purpose that water-rotted hemp will;) and No. 4, common dew-rotted hemp. The rope was not of a uniform size; from which fact, I concluded to make a second test trial, and send you the statement. The editors of the city papers were present, and a number of intelligent gentlemen. The enclosed printed paper is the account of this trial.

At Lexington, I had an interview with Mr. Hamilton, my predecessor. He said he had closed his accounts with the department; that he had no money belonging to the government; that he had kept no book of his transactions as agent. He handed to me some letters and copies of instructions that he had received, and gave me the following list of articles belonging to the United States government, purchased for the use of the hemp agency at Lexington, viz:

One hemp press, Warner's patent, cost $150.

One hatchel.

One desk.

A box of samples of hemp, &c.

The hatchel and box of sample hemp I have directed to be sent to Louisville, and ordered a sale of the desk.

The press is the one most approved by shippers of hemp. It can be sold for nearly cost, or retained for use, should it be thought, hereafter, advisable to purchase hemp in Kentucky.

I have visited the hemp district of most importance in Kentucky—the counties of Franklin, Woodford, Scott, Fayette, and Bourbon; had a free conversation with many growers of hemp, gentlemen of intelligence and liberal views. I am of opinion that contracts could be made for the growing crop, to be water-rotted, from three to five hundred tons, to be delivered at Louisville, of a quality equal to any purchased by the government, at one hundred and fifty dollars per ton.

The counties of Mason and Fleming, in this State, produce large quantities of hemp. The shipping point for these is Maysville. I think of visiting them next month.

Very respectfully, your obedient servant,

LEWIS SAUNDERS.

Commodore C. Morris,
Chief of Bureau of Construction, &c.

Second trial of hemp.

Mr. Saunders, the government hemp agent, made a second trial of the comparative strength of different kinds of hemp, with a result again favorable to the American article. We are glad to learn that similar experiments are to be reported, and that no efforts are to be wanting to settle fully and definitely the comparative merits of the American and foreign articles.

Mr. Saunders has applied the term "Rhodian" to the hemp prepared by Mr. James Anderson by heat, without rotting, called by Mr. Hawes, in his certificate, "Humbuggery," from the name of the place where it is prepared:

KENTUCKY HEMP AGENCY,
Louisville, June 9, 1845.

A second testing, proving the strength of three sorts of hemp, (by the government apparatus,) was made to-day, in the presence of a number of highly intelligent gentlemen.

To Mr. Hawes, a ropemaker of this place, were delivered twenty-five pounds No. 1 American water-rotted hemp, twenty-five pounds No. 2 Riga Rein, (these two parcels are fair selections out of the two boxes of hemp sent to this agency from the navy-yard at Boston, for comparison with Kentucky production,) and twenty-five pounds No. 3 Rhodian hemp. The latter was cured by heat; the method of doing it will hereafter be communicated to the department by Mr. James Anderson, of this city.

Mr. Hawes was requested to make bolt-rope of each parcel of hemp, as near $1\frac{3}{4}$ inch in circumference as he could, to spin the yarns uniformly alike, and to make and lay the rope the same way.

Ten feet in length of each number was cut off and accurately weighed.

No. 1 American water-rotted, ten feet weighed fourteen and three quarters ounces, measured in circumference one and seven-tenths inch, parted at 2,940 pounds.

No. 2 Russia, ten feet weighed fourteen and three-fourths ounces, measured in circumference one and eight-tenths inch, parted at 2,218 pounds.

No. 3 Rhodian, (Anderson's,) ten feet weighed thirteen and one-fourth ounces, measured in circumference one and six-tenths inch, parted at 2,440 pounds.

LEWIS SAUNDERS, *Hemp Agent.*

There will be required many trials before we can designate a standard, but a standard must be established in order to compete, effectively, with the foreign article. In the language of Commodore Morris, we ought to be exporters instead of importers of hemp.

The following is the certificate of Mr. Hawes, who manufactured the rope on which the above experiments were made:

LOUISVILLE, *June* 9, 1845.

In the three lots of hemp presented to me, I found the water-rotted produced more tow than either of the three, and the "Humbuggery" [Rhodian] less, in the same mode of hatcheling.

Respectfully yours,

E. W. HAWES.

Mr. L. SAUNDERS,
United States agent.

In order to make the comparison in the preceding experiments fair, it is necessary to reduce these results to what they would have been with ropes of the same size. We may assume the compactness of the twist and the weight of the fibre to be nearly the same; as the difference in the circumference of the ropes accounts very nearly for the difference in their weights. We shall suppose, then, that each rope had been 1 8–10 inch in circumference. The strength, by a well known principle, is directly proportional to the area of a transverse section; and these areas are as the squares of the circumferences. Take the case of the Rhodian hemp. If 1 6 10×1 6-10 gives 2,440, what will 1 8-10×1 8-10 give? The result is 3,108.

Reducing the result of No. 1, the same way, gives 3,296. So that the experiment may be stated as follows:

No. 1 American water-rotted	3,296
No. 2 Riga Rein	2,218
No. 3 Rhodian	3,108

The difference between the first and third is not more than might be expected in different specimens of the same kind of hemp; whilst the difference between them and the second or Russian hemp is very considerable, and much to the advantage of the former. These experiments will be continued; and we shall have more to say on their importance hereafter.

INSPECTION OF HEMP.

NAVY DEPARTMENT, *July* 18, 1845.

SIR: In the instructions which you may hereafter have occasion to give to the agents for testing, inspecting, and purchasing American water-rotted hemp for the use of the navy, you will authorize the inspection and test that may be made at the several agencies in the hemp-growing regions to be final and conclusive, instead of requiring them to be repeated at Boston.

Whenever it shall become necessary to procure further supplies of hemp, you will direct that contracts be made for its delivery at either of the agencies established; the department to be at the risk and expense of conveying it thence to the Charlestown yard, or wherever else it may be wanted.

I fully appreciate the considerations which have heretofore induced you to require the final inspection to be made at the place of manufacture, and have not, without hesitation, adopted a different conclusion. But, from a careful perusal of the resolutions of Congress on the subject, and the opinions of some of the legislators who assisted in passing them, I cannot resist the conviction that they were designed to encourage the culture of this important staple, by opening to its producers a valuable market in their own region. To require them to sell at an inspection twelve hundred miles distant from their homes, must operate, in a great measure, to deprive them of this market, and have a tendency, therefore, to defeat the expressed intentions of Congress in their behalf.

Entertaining this opinion, and feeling a deep interest in whatever concerns the agriculture of the country, I am induced to hazard the slight inconvenience and expense which may temporarily result to the government from the proposed change, for the sake of the permanent benefit which it may confer upon it in the increased culture, improved quality, and reduced prices of American hemp. While our agents at the west are competent and

faithful in the discharge of their duties, the department may reasonably rely upon them, or upon such special agents as it may appoint, for a safe and rigid inspection of the supplies which may be offered for their approval; and the risk of transporting the quantity thus approved to the place where it is required for manufacture, Congress seems to have devolved, by its recent action, upon the government.

One of the principal reasons which have induced your previous action on this subject appears to be that provision of Congress which requires all supplies for the navy to be furnished, after public advertisement, by the lowest bidder. You will meet the requirements of this law, and the purposes of the Congressional resolves, to which I have referred, by advertising, in the first instance, exclusively for American hemp; and you will allow foreign hemp to come into competition with our own only when the latter cannot be obtained on the conditions prescribed by law.

Acknowledging the interest which you have uniformly manifested in this important subject, and assuring you of the diffidence with which I direct this change in your accustomed action,

I am, very respectfully, yours,

GEORGE BANCROFT.

Commodore C. Morris,

Chief of Bureau of Construction, &c.

HEMP.

We find the following correspondence in the Louisville Democrat, which we give below, with the remark that some of the views of Mr. Barlow should be received, in our opinion, with considerable allowance. We cannot say but that boiling hemp in the stalk may improve it for some purposes; but if, by boiling, "the glutinous matter is fully extracted from the lint," which is very questionable, the hemp would not answer for naval purposes. We believe that nothing is now more fully established, than that the glutinous matter should be retained in hemp for tarred cordage—not that it may take more tar, but less.

Grass Hills, *August* 9, 1845.

It is very gratifying to see so much interest elicited in various parts of the country in relation to hemp. The importance of this great crop, in many parts of the State, is now of the first consideration. Without having yet supplied *any* for the navy of the United States, and but little for commerce, the crop of Kentucky has averaged not less than twenty thousand tons for the last five years.

The passage of the joint resolution by Congress, in 1841, giving the preference to American water-rotted hemp over the foreign article, has turned the attention, *the thought, of many inquiring, ingenious minds* to that subject. The enclosed letter from Mr. Barlow will no doubt be read with much interest. This is the commencement of an *era* in the manufacture of hemp, so ardently and firmly believed in by my friend John George Baxter, (now dead,) more than twenty years ago. Mr. B.'s ideas astounded the incredulous at that period. He asserted that hemp would bleach whiter than either flax or cotton, and make the finest fabric, from lace and cambric down to

good shirting, and far cheaper than either. I will, however, send you Mr. Baxter's paper at another time.

LEWIS SAUNDERS.

WASHINGTON CITY, *July* 25, 1845.

DEAR SIR: I perceive, by your publications, that you are making experiments in testing the quality of the many different kinds of hemp. Having been myself, for the last three years, fully devoted to the subject of water-rotting hemp, and believing that you are desirous to obtain any useful information on the subject, I would beg leave to lay before you the result of my own experiments in the water-rotting process. It is not my present purpose to impose on your attention a history of all that I have done or attempted to do, but will only suggest to you what was finally effected by a regular train of experiments. In the usual mode of water-rotting hemp, much of the good or ill success depends on the temperature of the water and stage of the weather. Under the many different circumstances, a similar fermentation is brought on sooner or later; and after the hemp becomes macerated, the most difficult part of the process is to stop the fermentation or putrefaction at the right point: the hemp often continues to rot even after it is cleaned out and converted to use—ever subject to what is called a dry rot. In order to overcome that difficulty, I put the hemp into strong tight vats, filled with water sufficiently warm to produce an effectual and equal maceration of all the parts of the lint in the same time. Then, by the use of steam-pipes I raised the temperature of the water up to a strong boiling point. The boiling is to be kept up for three or four hours, which will at once fully arrest or dispel all the putrefaction that was connected with the hemp—*cooked, to keep it from spoiling;* in the mean time the glutinous matter will be fully extracted from the lint. The water is then drawn off, and the hemp is taken out of the vat in a safe and sound condition. It may be set out in the weather for a whole year, without sustaining any material injury. It is also free from any short hurds when broke or cleaned, and much stronger than any other hemp that I have been able to compare it with. The lint is strong from end to end, soft, and fibrous. The glutinous matter being extracted, it will receive more tar than hemp, prepared in any other way. The quality may be more effectually tested by making ropes of an equal size or weight of that and other best samples of hemp, and bury all together in mud and water for any proper length of time; when taken up and put to the test, the result will fully show the difference in the quality of each kind of hemp.

Yours, respectfully,

THOS. H. BARLOW.

LEWIS SAUNDERS, Esq.,
Hemp agent for Kentucky.

PURCHASE OF HEMP.

We give below an interesting correspondence, which we find in the Democrat, as well as the remarks of that print; which are, perhaps, fair enough.

If hemp is to be purchased here at the west, there should be no delay on

the part of the government in making preparations for it. Let it be both inspected and purchased here, that the hemp-growers can receive their money, and have no further trouble about it, and they will be satisfied. No farmer will be satisfied with having his hemp pass inspection here, if he has to be at the further trouble of taking it around to Boston to be sold. Every farmer knows too much about the tricks of politicians and the tricks of trade to run any such risk.

Although Mr. Saunders, in his letter to the Democrat, says "that purchases will hereafter be made in the west," it will be seen that Mr. Bancroft, neither in his previous letter, which we have published, nor in this one, authorizes, except by inference, such a conclusion. The Democrat says:

"The reader will see, in another column, a communication from Mr. Saunders. This gentleman is indefatigable in his exertions to secure to the agriculturists of the west the advantages to which they are entitled. We congratulate him on his success. The Secretary of the Navy has given the subject his prompt attention. For the former arrangement of inspecting hemp at Charlestown, Mr. Bancroft is not responsible. As soon as he had time, he gave the subject the attention its importance demanded, and set the matter right. Let the same justice be meted out to the west in other things, and we shall feel the benefit of it."

—

GRASS HILLS, *August* 6, 1845.

The hemp-growers of Kentucky will see, by the annexed letter from the Secretary of the Navy, that the order directing the final inspection of hemp to be made at Boston has been rescinded, and that purchases will hereafter be made in the West.

The full supply of suitable hemp for the navy of the United States now devolves on the farmers themselves. The soil and climate of many parts of Kentucky are well adapted to its culture; the natural strength of the hemp is not surpassed by the production of any country. Have the hemp rotted in water of a *uniform* temperature, (not *overdone*,) then thoroughly cleaned; it will come up to the navy standard, and, after supplying the government, be sought after for the commerce of the world.

LEWIS SAUNDERS.

NAVY DEPARTMENT, *July* 29, 1845.

SIR: Your letter of the 21st instant has been received. The suggestions you offer, that a quantity of water-rotted hemp be advertised for, so as to give notice to the farmers in season to prepare it, will be fully considered at an early day.

Not being able, after reflection, to concur fully in the propriety of the order which directed that the final inspection of hemp must be made at Boston, I have caused that order to be rescinded, and the inspection made hereafter at the agencies in the west will be conclusive. In thus dispensing with the second inspection, I feel desirous to impress upon you the necessity of vigilance in the discharge of your official duties. If an inspection at the west shall be found efficient and safe, not only will this change have been justified, and the action of Congress upon the subject approved, but

the hemp-growers of that region must necessarily feel the benefit in future of an extended market, and an increased demand for their valuable staple.

Very respectfully, your obedient servant,

G. BANCROFT.

Lewis Saunders, Esq.,
Hemp agent, Louisville, Kentucky.

From the Dollar Farmer.

TO HEMP-GROWERS.

The following is from a source entitled to full confidence, and will attract the attention not only of the hemp-growers of Jefferson county, but of all others throughout the country:

To the Editors of the Louisville Journal and Dollar Farmer:

Gentlemen: I hope that what I write may be seen by the hemp-growers of Jefferson county, that they may read it, and that they may not sneer at it as the production of a city farmer, but that they may be profited by it.

By the present mode of growing and preparing hemp in this county, it is almost worthless for cordage and all the finer uses to which hemp is applied; it is not worth, in any of the eastern markets, as much by thirty dollars per ton as if it were properly prepared; and for bagging and rope, which is the coarsest use to which it is applied, it is not worth as much by fifteen or twenty dollars per ton as the hemp grown about Lexington and Maysville. For illustration, I will state that fair handled hemp will yield sixty or seventy pounds of clean hemp from each hundred weight; very ordinary hemp will yield forty-five or fifty pounds suitable for bagging; and a fair average of Jefferson county grown hemp will not yield over thirty-five or forty pounds from a hundred weight.

This great difference in value is attributable to the following causes: *First.* The land is not sufficiently pulverized before the seed is sown, and thus it comes up irregular, and produces a coarse, bark-like lint. This can be easily prevented by a liberal use of the harrow and roller. *Secondly.* In the process of cutting, they "gather" with the hook, and thus hack or partly cut asunder the lint on almost every stem, which is the chief cause of so much tow being made in the process of hackling. This mode of "gathering" the hemp with the hook is not practised anywhere in the United States except in Jefferson county. It is easily prevented: it only requires determination on the part of the farmer that his negroes shall not do it; and could they be made sensible of the loss they sustain by it in the depreciated value of their hemp, I am sure they would not longer permit it to be done. I would also suggest that they use the crooked hook, which is used in all the other counties of the State—at least, that they will try it before rejecting my suggestion. I am sure that a hand will cut one-third more per day than with the straight hook, and that he will do it better; and more by far than both these, they will avoid this destructive practice of gathering with the hook. *Thirdly.* It is common in this county to plough the ground before the hemp is spread upon it to rot; thus many stems are imbedded in the mud and become black-rotted—indeed, all the hemp is seriously injured and lessened in value by the mud. This can be prevented by having the hemp cut close and smooth to the earth, so the hemp for rotting can be spread upon it; or, if

this cannot be done, let a heavy roller be passed over the ground to mash down the stubbles. *Fourthly.* When breaking the hemp, they pound it too much with the brake, instead of ejecting the choves, after being thoroughly cracked with the brake, by whipping the hemp across the brake; their object is to leave in as much tow as possible, on account of weight; but a little observation and calculation will show this to be false economy. How much tow can they possibly leave in the hemp, and yet eject all the choves? Say twelve pounds in the hundred weight. Any bagging manufacturer will pay more than this difference, if this twelve pounds of tow had been whipped out; with hemp at three dollars per hundred weight, it is only thirty-six cents, or seven dollars and twenty cents per ton. At any eastern market, where hemp is chiefly wanted for cordage, a difference of fifteen dollars would be made. But I am well aware that the Jefferson farmers cannot venture to whip the hemp across the brake, so long as they permit their negroes to cut it asunder in the middle by gathering with the hook instead of gathering with the hand and arm.

I know that there are two or three farmers in Jefferson county who are exceptions to what I have said. As a citizen of Jefferson county, I would of course give the Jefferson farmer the preference in the purchase of hemp, at the same price, if of equal quality; but further I could not go, in justice to myself, nor will any manufacturer; but unless they will prepare their hemp as well as it is done in the other hemp-growing counties of the State, they must expect to take a less price for it. During the present season, manufacturers have been paying three dollars for hemp here, when, at the same time, they were paying three dollars to three dollars twenty-five cents, and bringing it one hundred and fifty to two hundred miles at their expense; and this is not the result of concert among them, for such is the competition to purchase hemp, that it always brings the last cent that the manufacturer can afford to pay; and even if it were concert, could not the same concert be as easily effected at Maysville, Lexington, Frankfort, and St. Louis?

A Manufacturer.

APPENDIX No. 9.

ON FLAX.

From the New York Farmer and Mechanic.

MEETING OF THE NEW YORK FARMERS' CLUB.

Chairman.—Our regular subject is now in order—the *culture and manufacture of flax and hemp* in our own country.

Judge Van Wyck.—I had hoped that our president would have been here to-day, and to have heard the result of his reflections upon the subject. I will make a few remarks upon it. I fear that the culture of flax will not repay the farmer if it is conducted as it has hitherto been done for fifty years past. Too much labor, too much cost in getting it prepared and sent to a proper market. The price of seven and a half cents to twelve and a half cents a pound will not remunerate the producer. The most which can ordinarily be raised, if for the lint only, is about four hundred pounds the acre; if raised for seed only, two hundred pounds. The capital employed, consisting of land, in our part of the country worth $100 per acre; animals and tools, $50; labor and dressing, and getting to market, altogether say $200. While the price will average but ten cents a pound, it will not remunerate the farmer. Perhaps on rich western lands it would pay, but not in our quarter, where grazing and raising of breadstuffs is far more profitable. Grain crops cost us nothing like the labor and expense of flax. Flax must be raised, puffed, housed, rotted, dressed, and got to market, with much delay and expense. You cannot persuade our farmers to raise flax unless you show it to be profitable; and they know what is for their best interest to produce. England had to abandon the culture of flax in favor of corn and cattle, although the government gave bounties by way of encouraging the flax culture. It will never do in the northern States, unless some revolution is effected in the culture, dressing, &c. If, by machinery, the difficulties can be overcome, then it may answer.

Dr. Underhill.—It is not intended to recommend the culture of flax after the old method, but on rich soil. When cut in the flower by a cradle, instead of hand-pulling, &c., this is an entirely new plan. We speak of the culture for the United States, and in the rich soils of the country west—Arkansas, &c. The crop of flax does not, when cut in the flower, impoverish land half as much as when allowed to go to seed, and gives a double crop of the flax; and so much finer is the fibre, that it is worth fourteen or sixteen cents a pound. The machinery of Billings can dress the flax for three cents a pound! and by cradling, rotting, and dressing in the manner Billings does it, almost twenty per cent. more of flax is made than was made by the clumsy old method; and the quality of the fibre far superior, silky, and beautiful. Hemp is peculiarly fitted for the rich lands of the west. I exhibit to the club a specimen of the Agave hemp, from Yucatan.

The lamented Dr. Perrine brought this article into notice. He was one of the most devoted friends of American agriculture that I have known. This hemp is the strongest in the world for ship's cables. But common hemp is becoming very interesting as a crop in our country. Forty-five

millions of pounds were raised here in 1844. A pamphlet issued by a distinguished citizen of Kentucky did greatly contribute to this most valuable result. Hemp is also now cradled when green.

Judge Van Wyck.—It is admitted in Europe that flax, although pulled when in the flower, yet exhausts land more than grain crops; but when it goes to seed it becomes a scourge to the soil. Not so with hemp, of which twenty crops in succession can be produced on the same land with but little manuring, and the last crop be perhaps a better one than the first!

Chairman.—One cause of the neglected culture of flax is cotton, so agreeable and so useful as apparel for the greater part of the year. As to hemp, there is no doubt as to our capacity to raise it; but I think that Mr. Clay must have a fine soil and well cultivated. I do not think that hemp is so great an exhauster of the soil as flax. * * * It is a difficult thing to fix dyes in linen; the colors, notwithstanding the use of the known mordants, are apt to wash out of linen.

Mr. Wakeman.—Linen may be made a substitute for cotton to a certain extent. We now import linen to as great an amount, or rather more than we did forty years ago, but not so much in proportion to population. We can raise say 448 pounds of flax per acre; Ireland raises upwards of 500. If ten cents a pound be the price, it is worth more than the cotton raised upon an acre. Everything in our country has been against linen. The duties began at 5 per cent. on sheetings, &c., then went up to $12\frac{1}{2}$. In 1812 they went up to $37\frac{1}{2}$ per cent. A great many manufactories of flax were commenced, and were operating extensively. The double duty and the war caused that. After the war the duty was 15 per cent., while upon cotton it was from 80 to 100 per cent. On woollen it was 25 per cent. In 1828 linen was 15 per cent.; hats, boots, &c., were at 30 per cent.

Had the same protection been extended to linen as to cotton, we should now be exporters of linen; now, that staple is all down. Our people must have proper inducement to go into the linen business, or they will never do it.

Flax is manufactured in Europe, into handkerchiefs, at 3,500 per cent. advance on its first cost.

Judge Van Wyck.—And cotton at 5,000 per cent.

Mr. Bergen, of Gowanus.—I have seen much flax raised. I do not think it is now a profitable crop. After the farmer has raised his flax, and even spun it into thread, he can buy his cotton thread cheaper than he can get his thread wove into linen. Flax is no greater exhauster of the soil than many other crops. He constantly looks for the greatest profit. Now, sir, it is said that if machinery shall be introduced, the profit will be got. It may be so; but how are we to get it? There are many ways proposed for the encouragement of flax and hemp culture and manufacture. But there is only one way; that is, to impose duties on the importation of flax. That is at the root of the matter: do that, and you will soon have a supply even for exportation.

Chairman.—I am for encouraging every profitable operation. No doubt exists as to the profit of raising flax on the rich lands of the west.

Mr. Wakeman.—With flax at 9 cents a pound, why cannot we manufacture linen? Linen keeps up in price, while cotton fabrics have fallen 75 per cent. Before long, probably, we shall prepare flax for $1\frac{1}{2}$ cent instead of 3 cents a pound, and improve in machinery. We ought not, at all events, to depend on foreign nations for that, or for any other necessary of

life. There is no land in Europe equal to ours for the production of flax and hemp, viz: the rich alluvial soil of the west.

Dr. Underhill.—We have much to do if we undertake to supply our own domestic wants, for we import now some millions. We now use cotton thread. The linen thread is much the best and strongest, and we cannot do without linen towels.

Mr. Fleet.—We have had specimens of manufactured linen from the household of Dr. Crispell, of Ulster county. He does it all in the old way, and the articles are very excellent. I agree that flax is peculiarly adapted to the rich soils of the western country.

Judge Van Wyck.—Flax is now admitted free.

Mr. Abbott.—In Ireland they pull flax after the leaves begin to turn yellow at the bottom of the stem, and after the flower is off, but before the seed has been matured.

Mr. Billings, of Missouri, was requested by the chairman to state his process of flax-rotting and dressing, and proceeded to state that for about three years past he has devoted himself to trials, and that his process differs very materially from the old methods. I pull or cut the flax green. We cut it now, having a proper cradle to do it with; a man cuts an acre in a day. I dry it in the shade. I rot it in water at 90 degrees of heat. The acetous fermentation takes place, and in three days it is rotted. I put it then in close rooms—heated until it is dry. It was said formerly that our flax was inferior to British, Belgian, or French; but when our flax is treated as I have stated, it is a superior article to any of them. I sow three bushels of seed per acre, instead of the old-fashioned one bushel.

Chairman.—In Cambray I remarked that they always put out their cambrics in the night time—always avoiding exposure to the sun; thus, as they said, preserving its fine appearance.

From the Cultivator.

BARLEY AND FLAX GROWN TOGETHER.

An experiment has been tried the past summer by some gentlemen of this town in raising barley and flax together, and has been attended with success, as appears by the following statements of Colonel Stibbins. He prepared an acre of ground for barley: after sowing two bushels on the ground, he then sowed one bushel of flax-seed on the same acre. In the fall he threshed the barley and flax out together with a machine, (it was cut and secured together,) and on cleaning it up he had 30 bushels of barley and 15 bushels of flax-seed. The sale of the crop stands thus:

Thirty bushels of barley, at 50 cents per bushel - - -	$15 00
Fifteen bushels of flax seed, at $1 per bushel - - -	15 00
	30 00

Colonel S. says the flax-seed was a clear net profit, as he thinks the ground produced as much barley as if no flax had been sown; for he had sowed barley on a few acres adjoining this acre, which produced only 30 bushels to the acre, and the land equally as good.

G. W. B.

Earlville, *New York*, 1846.

From the American Agriculturist.

CULTURE OF FLAX.

The following directions for the culture and proper management of the flax crop were compiled by the committee of the Society for the Promotion and Growth of Flax in Ireland. They have been carefully arranged from the mass of information obtained by the society and their agriculturists, during their four years' experience in the improved system of management. By this system, Irish flax has been produced which brought, in some cases, the high prices of £90 to £140 ($450 to $700) per ton. Messrs. Abraham Bell and Son, extensive shipping merchants of this city, have deemed them of so much importance that they have had them extensively published, and we transfer the same to our columns, esteeming it the most valuable article we have ever met on the subject. If the flax rotting and dressing machines spoken of in page 331 of this number perform all that is anticipated, the United States will be able to grow large quantities of it for the foreign market, which will be adding another important item to our agricultural exports, and greatly increase the wealth of the farming population. Formerly, considerable quantities of flax were grown in this State and New England; but since the introduction of cheap cotton fabrics as a substitute for linen, its culture has been almost entirely neglected. It is still grown extensively in Pennsylvania, Ohio, and parts of Kentucky.

Soil and rotation.—By attention and careful cultivation, good flax may be grown on various soils; but some are much better adapted for it than others. The best is a sound, dry, deep loam, with a clay sub-soil. It is very desirable that the land should be properly drained and sub-soiled, as, when it is saturated with either underground or surface water, good flax cannot be expected.

Without method, there cannot be success; different soils require a difference of rotation. In the best soils of Flanders flax is grown in the third year of a seven-course rotation, or the fifth of a ten-course rotation. It is not considered generally advisable to grow flax more frequently than once in ten years. In Belgium, it invariably follows a corn crop—generally oats; and in this country, where oats is such a principal crop, the same system might be profitably pursued; but it must be understood that it is only after oats following a green crop or old lea, and never after two or three succeeding crops of oats, which bad practice still prevails in some districts. It is a very general error among farmers to consider it necessary that flax should follow a potato crop. Except on very poor soils, a better crop will be produced after grain, and the double benefit of the grain and flax secured. If old lea be broken up, and potatoes planted, a very fine crop of flax may be obtained in the following year.

Rotation of crops for flax.—The following rotation, which would bring flax once in ten years, has been proposed: First year, potatoes; second, barley, laid down with grasses; third year, cut for soiling; fourth year, pasture; fifth year, flax; or the one half might be better in flax, the other in oats—so that, with the return of the rotation, which would be in five years, the flax could be put on the ground which, in the last rotary course, was under corn, throwing a range of ten years between the flax crops coming into the same ground.

A gentleman of much practical knowledge recommends the following as being the most profitable: 1. Oats, after grass and clover. 2. Flax, pull-

ed in August; then ploughed and harrowed in two cwt. guano and two cwt. gypsum; then sown with rape. 3. Potatoes, or turnips, well manured. 4. Wheat, and sown in spring with clover and rye-grass. 5. Hay and clover. 6. Grazing. 7. Oats. 8. Flax and winter vetches; guano, as before mentioned. 9. Turnips, well manured. 10. Barley, sown with rye-grass and clover. 11. Clover and hay. 12. Grazing. 13. Oats.

Preparation of the soil.—One of the points of the greatest importance in the culture of flax is by thorough draining, and by careful and repeated cleansing of the land from weeds, to render it of the finest, deepest, and cleanest nature. This will make room for the roots to penetrate, which they will often do to a depth equal to one-half the length of the stem above ground.

After wheat, one ploughing may be sufficient on light friable loam, but two are better; and on stiff soils, three are advisable—one in autumn, and two in spring, so as to be ready for sowing in the first or second week of April. Much will, of course, depend on the nature of the soil, and the knowledge and experience of the farmer. The land should be so drained and sub-soiled that it can be sown in flats, which will give more even and much better crops. But, until the system of thorough draining be general, it will be necessary, after oats, to plough early in autumn. Throw the land into ridges, that it may receive the frost and air; and make surface drains, to carry off the rains of winter. Plough and harrow very early in spring; and again a month after, to bring the land into good tilth, and clean it thoroughly from weeds and roots. Following the last harrowing, it is necessary to roll, to give an even surface, and consolidate the land, breaking this up again with a short-toothed or seed harrow, ere sowing.

Sowing.—The seed best adapted for the generality of soils is Riga, although Dutch has been used in many districts of country for a series of years, with perfect success. American seed does not generally suit well, as it is apt to produce a coarse, branchy stem. If used, it should only be on deep, loamy soils. Select plump, shining, heavy seed, of the best brands, from a respectable merchant. Sift it clear of all the seeds of weeds, which will save a great deal of after trouble, when the crop is growing. This may be done by fanners, and through a wire sieve, twelve bars to the inch. Home-saved seed, grown from foreign, has been used in many cases with success. It is suggested that a small portion of the crop may be allowed to stand until the seed be fully ripe, and then pulled, and the seed preserved for sowing; but the seed saved from *it* in the following year should only be used for feeding, or sold for the oil-mills. The proportion of seed may be stated at three-and-a-half imperial bushels to the Irish or plantation acre; and so on, in proportion, to the Scotch or Cunningham, and the English or Statute measure. It is better to sow too thick than too thin; as, with thick sowing, the stem grows tall and straight, with only one or two seed capsules at the top, and the fibre is found greatly superior in fineness and length, to that produced from thin-sown flax, which grows coarse, and branches out, producing much seed, but a very inferior quality of fibre. The ground being pulverized and well cleaned, roll and sow. After sowing, cover it with a seed-harrow, going twice over it—once up and down, and once across or anglewise; as this makes it more equally spread, and avoids the small drills made by the teeth of the harrow. Finish with the roller, which will leave the seed covered about an inch, the proper depth. The ridges should be very little raised in the centre, when the

ground is ready for the seed, otherwise the crop will not ripen evenly; and when land is properly drained, there should be no ridges. The sowing of clover and grass-seeds along with the flax is not advised, when it can be conveniently avoided, as these plants always injure the root-ends of the flax. But carrots may be sown in suitable soils in drills, so that the person pulling the flax may step over the rows, which may be afterwards hoed and cleaned, and should have some liquid manure. A stolen crop of rape or winter vetches may be taken after the flax. Rolling the ground after sowing is very advisable, care being taken not to roll when the ground is so wet that the earth adheres to the roller.

Weeding.—If care has been paid to cleaning the seed and the soil, few weeds will appear; but if there be any, they must be carefully pulled. It is done in Belgium by women and children, who, with coarse cloths round their knees, creep on all-fours. This injures the young plant less than walking over it; which, if done, should be by persons whose shoes are not filled with nails. They should work also facing the wind, so that the plants laid flat by the pressure may be blown up again, or thus be assisted to regain their upright position. The tender plant pressed one way soon recovers; but if twisted or flattened by careless weeders, it seldom rises again.

Pulling.—The time when flax should be pulled, is a point of much nicety to determine. The fibre is in the best state before the seed is quite ripe. If pulled too soon, although the fibre is fine, the great waste in scutching and hackling renders it unprofitable; and, if pulled too late, the additional yield does not compensate for the coarseness of the fibre. It may be stated that the best time for pulling is when the seeds are beginning to change from a green to a pale brown color, and the stalk to become yellow, for about two-thirds of its height from the ground. When any of the crop is lying, and suffering from wet, it should be pulled as soon as possible, and kept by itself. So long as the ground is undrained, and imperfectly levelled before sowing, the flax will be found of different lengths. In such case, pull each length separately, and steep in separate pools, or keep it separate in the same pool. If the ground has been thorough-drained, and laid out evenly, the flax will be all of the same length. It is most essential to take time and care to keep the flax *even, like a brush,* at the root ends. This increases the value to the spinner, and of course to the grower, who will be amply repaid by an additional price for his extra trouble. Let the handfuls of pulled flax be laid across each other diagonally, to be ready for the

Rippling—Which should be carried on at the same time, and in the same field, with the pulling. If the only advantage to be derived from rippling was the comparative ease with which rippled flax is handled, the practice ought always to be adopted. But besides this, the seed is a most valuable part of the crop, being worth, if sold for the oil-mill, £3 per acre; and if used for the feeding of stock of all kinds, £4 per acre. The apparatus is very simple. The ripple consists of a row of iron teeth screwed into a block of wood. This can be procured in Belfast, or may be made by any handy blacksmith.* It is to be taken to the field where the flax is being pulled, and screwed down to the centre of a nine-feet plank, resting on two

*The best ripples are made of half-inch square rods of iron, placed with the angles of iron next the ripples; three-sixteenths of an inch asunder at the bottom, half inch at the top, and eighteen inches long, to allow a sufficient spring, and save much breaking of flax.

stools. The ripplers may either stand or sit astride, at opposite ends. They should be at such a distance from the comb as to permit their striking it properly and alternately. A winnowing sheet must be placed under them, to receive the bolls as they are rippled off; and then they are ready to receive the flax just pulled—the handfuls being placed diagonally, and bound up in a sheaf. The sheaf is laid down at the right hand of the rippler, and untied. He takes a handful with one hand, about six inches from the root, and a little nearer the top with the other. He spreads the top of the handful like a fan, draws the one half of it through the comb, and the other half past the side; and by a half turn of the wrist, the same operation is repeated with the rest of the bunch. Thus the flax can be rippled without being passed more than once through the comb. He then lays the handfuls down at his left side, *each handful* crossing the other, when the sheaf should be carefully tied up and removed. The object of crossing the handfuls so carefully after rippling, when tying up the beets for the steep, is that they part freely from each other when they are taken to spread out on the grass, and not interlock and be put out of their even order, as would otherwise be the case. If the weather be dry, the bolls should be kept in the field, spread on winnow-cloths, or other contrivance for drying; and if turned from time to time, they will win. Passing the bolls first through a coarse riddle, and afterwards through fanners, to remove straws and leaves, will facilitate the drying. If the weather is moist, they should be taken in-doors, and spread out thinly and evenly on a barn floor, or in a loft, leaving windows and doors open, to allow a thorough current of air, and turned twice a day. When *nearly dry*, they may be taken to a corn kiln (taking care not to raise it above summer heat) and carefully turned, until no moisture remains. By the above plan of *slow* drying, the seed has time to imbibe all the juices that remain in the husk, and become perfectly ripe. If it be taken at once from the field, and dried *hurriedly* on the kiln, these juices will be burnt up, and the seed will become shrivelled and parched, little nutritious matter remaining. In fine seasons, the bolls should always be dried in the open air, the seed threshed out, and the heaviest and plumpest used for sowing or crushing. The light seeds and chaff form most wholesome and nutritious feeding for cattle. Flax ought not to be allowed to stand in the field, if possible, even the second day; it should be rippled as soon as pulled, and carried to the water as soon as possible, that it may not harden.

Watering.—This process requires the greatest care and attention. River water is the best. If spring water has to be used, let the pond be filled some weeks, or months if possible, before the flax is put in, that the sun and air may soften the water. That containing iron, or other mineral substances, should never be used. If river water can be had, it need not be let into the pond sooner than the day before the flax is to be steeped. Place the flax in the pool in one layer, somewhat sloped, and in regular rows, with the root end uppermost. Cover with moss sods, or tough old lea sods, laid perfectly close, the sheer of each fitted to the other. Before putting on the sods, a layer of rushes or rag weeds is recommended to be placed on the flax, especially in new ponds. Thus covered, it never sinks to the bottom, nor is it affected by air or light. A small stream of water allowed to run through a pool has been found to improve its color. It will be sufficiently steeped, in an average time, from eight to fourteen days, according to the heat of the weather and the nature of the water. Every grower should learn to

know when the flax has had enough of the water, as a few hours too much may injure it. It is, however, much more frequently *under*-watered than *over*-watered. The best test is the following: Try some stalks of average thickness, by breaking the *shove*, or woody part, in two places, about six or eight inches apart, at the middle of the stalk; catch the broken bit of wood, and if it *will pull freely out, downward, for that length, without breaking or tearing the fibre, with none of the fibre adhering to it*, it is ready to take out. Make this trial every six hours, after fermentation subsides, for sometimes the change is rapid. Never lift the flax roughly from the pool with forks or grapes, but have it carefully handed out on the bank by men standing in the water. Spread on the same day it is taken out, unless it be raining heavily; light rain does little harm. If it cannot be spread, let it be set on end, or separated into small parcels, to prevent it heating in the heap. It is advantageous to let the flax drain for a few hours after being taken from the pool, by placing the bundles on their ends, close together, or on the flat, with a slope.

Spreading.—Select, when possible, clean, short, thick pasture ground for this operation; and mow down and remove any weeds that rise above the surface of the sward. Lay the flax evenly on the grass, and spread thin and very equally. If the directions under the head of rippling have been attended to, the handfuls will come readily asunder, without entangling. Turn it two or three times while on the grass (with a rod about eight feet in length, and an inch and a half in diameter,) that it may not become of different shades by the unequal action of the sun, which is often the case through inattention to this point. Turn it when there is a prospect of rain, that the flax may be beaten down a little, and thus prevented from being blown away.

Lifting.—A good test of its being ready to lift, is, to rub a few stalks from the top to the bottom; and, when the wood breaks easily and separates from the fibre, leaving it sound, it has had enough of the grass; also, when one stalk in fifty is perceived to form *a bow and string*, from the fibre contracting and separating from the woody stalk. But the most certain way is to prove a small quantity with the hand-break, or in a flax mill. In lifting, keep the lengths straight and the ends even, otherwise great loss will occur in the rolling and scutching. Tie it up in small bundles; and if not taken soon to be scutched, it will be much improved by being put up in small stacks, loosely built with stones or brambles in the bottom, to keep it dry, and allow a free circulation of air. Stacks built on pillars would be the best.

Drying—by fire, is *always pernicious.* If properly steeped and grassed, no such drying is necessary; but to make it ready for breaking and scutching, exposure to the sun is sufficient. In some districts it is put to dry *on kilns* in a damp state, and is absolutely burnt before it is dry, and the rich oily property of the flax is always greatly impaired. On this point the society can scarcely speak too strongly, as the flax is either destroyed or rendered not worth one-half of what it would be, if properly dried.

Breaking, or scutching—If done by hand, should be done on the Belgian system, which is less wasteful than that practised in Ireland. If by milling, the farmer will do well to select those mills in which the improved machinery has been introduced. The society would also recommend that the farmer should endeavor to have his flax scutched by a mill owner who pays his men by the day, and not by the stone, even if it should cost

him higher in proportion, the system of paying the scutchers by the stone rendering them more anxious to do a large quantity in the day, than to produce a good yield from the straw.

The Courtrai system.—This is the universal mode in the district from which the finest flax we receive is brought. As soon as pulled, the flax is stooked without binding it. The handfuls are set up, resting against each other, the root ends spread out, and the top ends joining like the letter A, forming stooking about eight feet long, and a short strap keeping the ends firm. In this way it will resist wind and rain well, and dry fast. In six or eight days it may be stacked in the field; the seed to be taken off at leisure, in winter; the flax to be steeped the following May—a system which possesses the advantages of affording the farmer the best season of the year for steeping and grassing, and a time of comparative leisure, when his attention is not called to the harvesting of other important crops. It has, in many cases, when tried in this country, proved highly successful; although in others it has failed, from want of experience, perhaps, in watering and grassing it. The treatment in this way has made the flax, in some cases, worth two or three shillings per stone more than part of the same crop steeped green. It is recommended that trials of this system should be made, in the first instance, on a small scale.

To avoid exhausting the land by growing flax.—It has always been urged against flax culture that it exhausted the soil; but this is not necessarily the case. If the seed be saved, and cattle fed upon the bolls, a valuable addition will be made to the manure heap, as perhaps the richest manure is produced by this kind of food. The putrescent water from the flax pools should be carefully preserved, and either used as a top-dressing for grass, or mixed with the weeds and other refuse of the crop, in a heap, to ferment. By these means almost all the matter abstracted from the soil by the flax crop would be returned in the shape of manure—the fibre being supplied by the atmosphere alone.

FLAX SOCIETY'S OFFICE, BELFAST, *January* 1, 1845.

ANSWERS BY MR. BILLINGS, OF MISSOURI, TO QUESTIONS IN THE N. Y. FARMERS' CLUB, ON THE CULTURE AND MANUFACTURE OF FLAX.

1st. What kind of soil shall I choose? and what manure?

Where there is most lime. On our best prairie land we add twenty bushels of lime to an acre: the lime should be first slacked. Use, also, good, well decomposed manure.

2d. When and how often and how deep shall I plough it?

Plough as soon as the crop is off the field in the fall—plough deep, and, if necessary, use the sub-soil plough, so as to plough 12 inches deep. Then, in the spring, plough four or five inches deep.

3d. When and how shall I sow the seed—broadcast, or in drills? and how many bushels to each acre?

As soon as the land is ploughed in the spring, harrow it lightly, and sow two and a half to three bushels of seed; then harrow well.

4th. How shall I keep the crop clean?

The crops keep clean of weeds by the close, thick growth of flax.

5th. How shall I gather the flax, and at what time?

Cut the flax with a cradle, having a scythe from eighteen to twenty-two inches in length. Cut as soon as the blossoms of the flax begin to fall.

6th. How shall I secure the crop when gathered? what quantity in a bundle?

Let the flax lie on the ground until it wilts. In fair weather it may lie there thirty-six hours. Wet weather must be avoided at this time, if possible. Bind up as much flax as a wisp of flax will bind in one bundle. Shock it on the field, so as to prevent wet from getting into it. Do not stack it. Leave it in the shocks for five or six days. When the weather is favorable, and it is about as dry as you would have your hay or oats, then house it.

7th. How long can I keep it before it is sent to market?

Fifty years! The flax is improved by keeping it a year. The gluten which is in it then dissolves more readily when you come to rot it.

8th. Is it worth my while to rot it on my own farm?

No; you cannot make so good a profit by doing it.

9th. Is it worth my while to have a machine for dressing the crop?

If you can raise two hundred acres of flax, then you can afford to rot and dress it. One hundred acres will not pay a sufficient profit.

10th. What is an average crop of flax in the United States per acre?

About two hundred pounds to the acre, if you let it all go to seed, but four hundred pounds if you gather it in the blossom. Ireland averages five hundred and fifty pounds an acre on one hundred thousand acres.

11th. Do you know how much it will cost to raise it per acre?

Twelve dollars an acre when housed.

12th. What is the cost of dressing it? How much can one of your dressing machines prepare in a day?

Three cents a pound, from the stack to the bale press.

One of my dressing machines, with seven men, will dress in one day six hundred pounds of flax; and so much less tow is made by it, that it saves twenty per cent. of the flax by my operation. And the same process answers for hemp. Flax, when rotted in water heated to ninety degrees of Fahrenheit, is done in three or four days. In raising flax, a part of a field should be sowed thin for the seed. Common Flemish and French dressed flax imported into England for forty years past brings them from four to eight hundred dollars a ton. This difference of value is owing to the difference of qualities, which are assorted.

Mr. Wakeman.—Can flax and hemp be grown for a series of years on the same ground; or is rotation necessary?

Mr. Billings.—I have known hemp grown on the same field perfectly well for twenty years in succession. The hemp crop is from seven hundred to nine hundred pounds an acre. I add lime to land for flax crop, but not for hemp. When flax is not allowed to go to seed, it does not exhaust the soil one-half as much. It exhausts about as much as the wheat crop. Our corn and wheat in Missouri certainly exhaust our soil. We have already found the necessity of deep ploughing and sub-soiling the land. It is better and cheaper, by four to one, to cradle flax, than to pull it by hand in the old way. We do not consider the rotting and dressing flax an unhealthy business.

Dr. Underhill, of Croton Point.—It is exceedingly important to establish the culture and manufacture of flax in our country. For the last twenty-five years Ireland has used the water-rotting process: they pulled their flax

before it went to seed. They have depended on the United States for their seed for the last half century. We supplied almost all their flax-seed for sowing. Dew-rotting is apt to weaken the fibre and render it less fine. They used to put their flax in still water, where it rotted in from seventeen to thirty days. Dew-rotting requires some three months. Some lay the flax on the snow, and let it remain until spring: a very bad plan. The flax is liable to great damage from cattle getting among it—it is very unequally rotted, and liable to become dirty: it loses its softness and fineness of fibre. The operation of cradling flax is an important one: you get rid of the roots of the plant, which are injurious in the dressing of the flax. I believe it would be profitable to raise flax, cut it in blossom, and water-rot it on the farm, at least until Billings's new plan can be found convenient to the farmer. Cotton is now whitening the ocean in the form of sails. Cotton is displacing linen in many ways. Our country is fast being filled with people: we must have profitable employment for all hands. We have climates for tea, coffee, grapes, plantains, bananas, yams, and every good thing, independent of the whole world. We must bring our country to that natural position to which it is entitled, and then I am for reciprocity treaties with all the world.

Mr. Billings.—We have exported some hemp to Dundee.

Edwin Williams.—We raise about forty thousand tons of hemp per annum.

Mr. Billings.—Fifty thousand.

Dr. Underhill.—In 1844, our western country raised about forty-five millions of pounds of it. They made the bagging and ropes for about two millions and a half bales of cotton. Two vessels loaded with our hemp left New Orleans for England last year, loaded with American hemp. The culture of hemp is increasing among us.

Edwin Williams.—In 1844 our import of cotton bagging was but one million six hundred thousand square yards. Many important articles of our trade are not well noted, or distinguished from masses, in our tables of import.

Mr. Meigs here read the following paper on the subject of flax:

The monthly committee meeting of the "Society for the Promotion and Improvement of the Growth of Flax in Ireland," was held on Wednesday at the society's rooms, Commercial Buildings, Belfast. The treasurer's report noted a receipt of £1,000 5*s.* since last meeting, 1st ult. A report of the sub-committee appointed to conduct the experiments on different kinds of flax-seed was read.

As the appearance of the flax grown from home seed is everywhere very fine this season, a paper was directed to be drawn up, for circulation among the farmers, urging them to reserve a portion of their growing crop for seed; letting it get ripe, and stacking it over until spring—the seed to be then separated, and the flax then to be steeped on the Courtrai system. This would do much to secure the genuine fresh seed for the crop of 1846. Arrangements were made for the opening of a hand scutching school in Youghal, where persons would be instructed in the Belgian mode, by one of the society's agriculturists. Several letters were read relative to flax-seed, &c., and referred to the sub-committee appointed to consult on the measures to be taken by the society to protect the farmer, in the most effective way,

against fraud in future seasons. The following extract from the letter of a gentleman in the county of Derry will prove interesting:

"I am happy to be able to bear my testimony to the fact, that if flax be judiciously grown, and well handled, there is no other crop that will pay like it. I had last season not quite 8 Irish acres of flax, from which I had 295 stones, which brought 8*s.* per stone in Cookstown market, and 31 stones at 6*s.*, besides $4\frac{1}{2}$ cwt. of scutching tow, at 9*s.* per cwt:

	£	s.	d.
295 stones, at 8*s.* - - - - - -	£118	0	0
31 stones, at 6*s.* - - - - - -	9	6	0
$4\frac{1}{2}$ cwt. tow, at 9*s.* - - - - -	2	0	6
	129	6	6

being upwards of £16 per acre. Besides this, I had an exceedingly large quantity of bolls, which fed my cattle to the greatest advantage during the whole season, and as much seed saved, on the Courtrai system, as sowed about three acres this year. The flax-seed saved on the Courtrai system turned out exceedingly well; and my steward showed some of the seed to Mr. MacAdam, of Donegall street, Belfast, who said that he thought it finer than any Riga seed he had seen last season. I may add, that the flax from our own seed looks to the full, better than that growing from Riga seed. We used but the two."

Mr. Meigs remarked, that the ingenious men of France and England had long been trying to make machinery to spin flax with the same facility as cotton; that the French chemists had carefully examined the fibres of flax, and discovered that the whole length of the flax is composed of delicate fibres, about three inches long, which, by means of chemical agents not injurious to that fibre, could separate it, and thus rendering it in staple nearly like cotton, and prepare it for the spinning machinery. When that can be accomplished with such economy that its price can be as low, or nearly so, as cotton cloth, there could be no doubt that for sheets, shirts, toweling, &c., mankind will far prefer the fabric of linen to that of cotton; and we would earnestly commend to the genius of our countrymen the invention of such process as can bring out that very valuable result; for in addition to the very well known preference for linen for many purposes, it is certain that flax grows well in vast portions of the globe where cotton cannot mature, for lack of heat, &c.

* * * * * * * * * *

Mr. Chapin.—On this subject I remark that the Chinese possess a grass called Chinese flax, which, from samples recently examined, appears to possess all the qualities of our flax, but in a higher degree, superior to any flax known or manufactured in England. This excellence consists in greater strength of fibre and fineness of staple, and length of staple also. Samples have been shown of fine linen manufactured from it, greatly resembling the French cambric, but having moreover a silky appearance. It seems also that this grass can be obtained in unlimited quantities. If these are facts, (and it would seem that they are,) it becomes an object of the greatest importance to our countrymen, as well as to Europe.

From a letter of Chas. L. Fleischmann, Esq., published in the Washington "Union," March 5, 1846.

AUSTRIAN LINEN MANUFACTURES, &c.

This branch of Austrian national industry is the oldest and one of the most important; but since cotton goods are coming daily more in use, it is declining in the same ratio as the cotton manufactures increase: it still, however, furnishes a greater number of pieces of various kinds, as well as all the other branches of a similar nature.

It is highly important for Austria that this branch of industry should rise again to its former importance, as it produces the raw material within its own territories, and especially in those regions where corn is an uncertain crop, and whereby the population obtain the means of procuring food and employment during the long winter season.

The yearly average crop is computed, according to official data, to amount to 1,500,000 cwt. of flax, and 1,000,000 cwt. of hemp.

The best flax is raised in Bohemia, Moravia, and Silesia; but its quality is not equal to that of Belgium. The farmer has not the proper knowledge of its culture, and less of the necessary manipulation in its preparation for the use of the spinner. The flax is generally prepared by dew-rot; and, from the following statement, the difference of quality between Austrian and Belgian flax (water-rotted) can be appreciated: 1 cwt. of Austrian flax, when prepared, yields 20 pounds of refuse, 50 pounds of tow, and only 30 pounds of flax; whereas Belgian flax gives 5 per cent. refuse, 20 per cent. of tow, and 75 per cent. of flax.

The yarn is almost all spun by hand. Austria has only eight flax-spinning factories, which have been in operation since 1835, and employ 20,800 spindles; England has now 700,000 spindles; France, 70,000; Belgium, 60,000; the countries in the German league, 30,000.

Flax spinning by means of machinery has been brought in England (like all other mechanical contrivances) to great perfection; and from thence Austria has procured her machines. The amount of capital required for such a factory is nearly eight times higher than for a cotton factory, on account of the complicated machines required for spinning flax.

A spindle is estimated at 80 to 100 florins, inclusive of building and other necessary apparatus; a cotton factory at 12 florins.

Weaving is also generally done by hand. The number of looms engaged in this branch amounts to 300,000, which occupy 500,000 weavers during the greater part of the year; about 12 spinners are necessary to supply a loom with yarn, which occupies about three and a half millions of persons in the linen business, or one-tenth of the whole population.

The above-stated number of looms produce yearly 4,600,000 pieces of linen, of 30 ells (yards) each, valued at 27,000,000 florins.

The following table shows the import and export of flax and linen in the year 1841:

	Imported.	Exported.
Flax	15,056 cwt.	25,199 cwt.
Yarn	20,902	5,701
Thread	209	1,926
Fine linen	8	1,722
Coarse linen	838	49,012
Various other linen goods	1,055	52,660

When the above table is compared with those of former years, it shows a great increase in the importation of yarn, which arises from the greater perfection of the English flax-spinning, which has produced such fine numbers as are unattainable with their less perfect machinery.

The following data are from the largest factories of Austria:

100 pounds of unprepared flax cost 20 florins, which yield 20 pounds of refuse, remainder 80 pounds - -	20 flor.
From this 80 pounds of flax are obtained, in hatcheling, 50 pounds tow, cost 10 florins per cwt. - - -	5
Remain 30 pounds hatcheled flax, at 50 florins per cwt. -	15
The wages for swingling, 34 kreutzers, and hatcheling, 46 kreutzers - - - - - - -	1 flor. 20 kr.
30 pounds of hatcheled flax cost, then - - - or $32\frac{2}{3}$ kreutzers per pound.	16 flor. 20 kr.
1 piece of yarn of the average, No. 45, weight $23\frac{1}{2}$ loth, or about 12 ounces, costs - - - - -	24 kr.
Which produces, in spinning, $12\frac{1}{2}$ per cent. refuse - -	3
Cost per piece - - - - - - -	27
Add to this the yearly expenses of repair, assurance, &c. -	13 84-100
Interest on the capital - - - - - -	3 50-000
Of this sum $22\frac{1}{2}$ kreutzers is for the material, and 21 84-100 kreutzers for the expense of spinning - - -	44 34-100

APPENDIX No. 10.

From the Albany Cultivator.

TOBACCO.

Messrs. Gaylord & Tucker: We grow in this town annually about three hundred tons of tobacco, and in the valley of the Connecticut about five hundred tons are grown annually. The yield the last year (1843) was less than usual, fifteen hundred pounds being about the average per acre. The price of tobacco the last season, of a fair growth, was seven cents a pound, and most of the crop was sold before housed and cured. We have two varieties of the weed, the broad leaf and the narrow leaf—the latter is about two weeks the earliest.

It seems our tobacco is of a peculiar species, or our soil and climate are peculiarly adapted for the production of a superior article.

The soil that produces our best tobacco is a light sandy loam. We prepare our beds for the seed as early in April as possible—select the richest or best land in the garden or on the farm, moist but not wet—manure and prepare it as we do for the cultivation of cabbage or any delicate plant for transplanting—pulverize and make the bed as fine and smooth as possible; then sow the seed broadcast, about as thick as we do cabbage seed; then roll or tread down the bed thoroughly, that the seed may be *pressed* into the soil. The bed is kept clean of weeds. In a common season the plants will be large enough for transplanting by the 10th of June. The land for the crop should be well manured, and ploughed at least twice before the time of transplanting, and harrowed and rolled, or bushed, and left as smooth as possible. We mark the rows three feet apart and straight; on the rows we make small hills for the reception of the plants, two feet to two feet six inches apart. We have our land all prepared by the time the plants are large enough for transplanting. If raining at the time, we take the advantage of it and get all our plants out; if not, we set and water. After this, the field is examined several times, and where plants are dry, or injured by worms, others are set in. As soon as they stand well, they are carefully hoed and vacant places filled with new plants; after this the cultivator is used between the rows and the crop kept clean with the hoe. The plants are frequently and thoroughly examined for the tobacco worms, and they must be destroyed; if not, the crop is sure to be. When in blossom, and before the formation of seed, it is topped about thirty-two inches from the ground, leaving from sixteen to twenty leaves on each stalk. After this the suckers at each leaf are broken off, and the plants kept clean till cut. When ripe, the time of cutting, the leaf is spotted, thick, and will crack when pressed between thumb and finger. It is cut any time in the day after the dew is off, left in the row till wilted, then turned; and if there is a hot sun, it is often turned to prevent burning; after wilted, it is put into small heaps of six or eight plants, then carted to the tobacco sheds for hanging. We usually use poles or rails about twelve feet long; hang, with twine, about forty plants on each rail—twenty each side—by crossing the twine from the plants one side to the plants the other, the rails about

twelve inches apart. It hangs from six to ten weeks to get perfectly cured, which is known by the stem of the leaf being thoroughly dried. It is then, in a damp time, when the leaves will not crumble, taken from the poles and placed in large piles by letting the tops of the plants lap each other, leaving the butts of the plants out. It remains in these heaps from three to ten days before it is stripped, depending on the state of the weather, but must not be allowed to heat. When stripped, it is made into small hands; the small and broken leaves should be kept by themselves. It is then, by the purchaser, packed in boxes of about four hundred pounds, and marked *seed-leaf tobacco.* The most of our last crop has been shipped to Bremen.

I think we can cultivate one acre of tobacco with the same labor and expense that we can two acres of corn, that produce sixty bushels to the acre; and the manure required is about the same as for the corn crop, and I do not think it exhausts the land as much as the corn crop, for it is not allowed to seed.

HENRY WATSON.

East Windsor, *January* 22, 1844.

Prospect Hill, *April* 26, 1844.

Dear Sir: Your favor of the 26th of March was duly received, and would have been sooner answered, but that I desired to obtain some information on the subject of your inquiry, from some of my friends in the tobacco-growing region of Mason county. I had occasion to take a ride through that part of the county two days since, and met with some intelligent tobacco growers, with whom I conversed freely on the subject. I was formerly engaged in the tobacco culture, but have for a number of years discontinued its culture; and was, therefore, desirous of availing myself of any late improvements which might have been made. For the general mode of treating the tabacco crop, from the sowing of the seed till it is prepared for prising, I refer you to my essay on that subject, published in the Kentucky Farmer in March, 1841, and which will be re-published in a volume of agricultural essays, now in press, and which will be ready for delivery in about two months, a copy of which I will do myself the pleasure of sending you. In this letter I shall attempt to give you such additional information as may be useful in producing the fine tobacco cultivated for cigar wrappers.

1. With respect to the kinds of tobacco cultivated for the above purpose. There are the Summerville and light Burley: some prefer the former, and some the latter. I do not understand that either has a decided preference.

2. As to the soil suitable for its growth. Fine tobacco is found to succeed best on light rich soil, having a portion of sand mixed with it. New or fresh land is better than old; and pretty steep hillsides, provided they are light and rich, are better adapted to producing fine tobacco than level land. Hillsides, facing the Ohio river, and the numerous small branches emptying into it, when the land is newly cleared, and sufficiently rich, are well adapted to produce fine tobacco. I have seen these in cultivation, having an elevation of from twenty to thirty degrees. But level lands, or

those nearly so, if new, and especially if the soil have a mixture of sand, are also well adapted to produce fine cigar tobacco.

3. As to the mode of cultivation. This, perhaps, is the most important point in producing fine cigar tobacco. The ground should be well prepared, and rendered as light and as finely pulverized as possible. In laying off for planting, I would advise the use of a single horse plough, throwing the ground into ridges three and a half feet from centre to centre, and then crossing, at right angles, with single furrows, at the distance of two feet from centre to centre, and make the hills, so as to be as near a true line as possible, three feet and a half from centre to centre one way, and two the other. I recommend the use of a one-horse plough in laying off, because in this way the ridges will be but little trodden down, and the ground will be left in a light condition. The difference in the width of the rows is to facilitate the working of the tobacco after it attains some size.

Close planting is found to be essentially necessary in raising fine tobacco. In the above mode of planting, each plant occupies seven square feet; and six thousand two hundred and twenty-three plants will stand upon an acre, if none be missing; and, allowing four plants to make a pound, the yield will be one thousand five hundred and fifty-five pounds per acre. I have heard of instances in which the product has been at the rate of a pound for three plants, or more than two thousand pounds per acre. But to produce this extraordinary crop, the season must be very favorable, and everything be managed in the most particular and skilful manner.

To make fine tobacco, it is very important to plant *early*, so that the tobacco may be cured at that season of the year when the weather is warm and dry. To this end, plant-beds should be sown very early and in situations where they have a good southeastern exposure. They should be lightly covered with brush to keep them moist until the plants get up, and a little while longer if there is danger of hard frosts. New ground is best for plant-beds. The hills for planting should be made as recently before the plants are ready as possible. These may be set out when very small, if the operation be skilfully managed, and thus the crop will be brought forward in good time. The plants should be topped to about sixteen leaves, exclusive of the ground leaves, which should be broken off. The top leaves will, of course, not make fine tobacco, and must be separated when stripping; but high topping is important to improve the quality of the first ten or twelve leaves on each plant.

It is the practice in Mason to cure tobacco without firing, except in damp rainy weather, when fire is applied to guard against what is called *house-burning*, the danger of which is always increased in rainy weather, especially where tobacco is hung close. The almost universal mode of building tobacco houses in Mason is, to erect a four-square pen of logs, hewed or round, with large open spaces between them, and then to construct a shed all around, about twelve feet wide, by planting posts in the ground, (locust if to be had,) and ship-lapping scantling on these, at proper distances, from which poles are extended to the cracks of the log pen. The shed should be planked up and down, to protect the tobacco from the weather. For the benefit of air, small interstices may be left between the planks, and it would be advantageous to have some broad planks, hung on hinges, on every side of the shed, which might be opened in dry weather for the purpose of ventilation. It is now too late to sow tobacco seed, but, if you wish it, I will procure and send you some in time for next year.

I have given, in answer to your inquiry, what seemed to me to be necessary. If you wish further information on any particular points, it will afford me pleasure, at all times, to comply with your wishes.

Yours, cordially and sincerely,

A. BEATTY.

To George W. Weissinger, Esq.

From the Floridian.

MODE OF CULTIVATING TOBACCO IN THE ISLAND OF CUBA.

Your nurseries are the first to be attended to, in your preparation for a crop, by selecting, at the proper season, a rich and tolerably moist piece of new ground, and prepare it by burning it off very clean, and breaking it up. The seed is then to be sown broadcast upon it, and when they are up they are to be overlooked daily, to see that the cut-worm does not commit ravages among the young plants; and as fast as the plants arrive at a proper size, they are to be transferred to the tobacco field, to make room for the smaller plants of the nursery. As casualties frequently arise to destroy some of the nurseries, it is necessary to guard against a probability of not having a sufficient number of plants, by making three or four nurseries, at an interval of one or two weeks each. Much attention should be observed to keep both your nurseries and fields very clean, particularly of grass, and for that reason new lands are preferred for both. In Cuba they plant on an even surface, and disturb it as little as possible with the hoe, only picking out the grass or weeds which spring up. The plants, when transferred to the field, are to be planted in squares, at about from two to three feet apart, according to the strength of the land. The high lands in Cuba are such as produce the quality of tobacco, both as to strength and color, that suits the American market best, and such lands correspond nearest to our high hammocks. The greatest enemy to the plants, both in the nursery and in the fields, (while small,) is the cut-worm, which has to be looked after early every morning; and wherever they have eaten the plants, they are to be found and killed, either on the plant or on the ground near it. When the plants get to be larger, then the large green tobacco-worm is to be constantly guarded against, and the suckers also continually broken off as fast as they appear; and when the tobacco is judged to be of a sufficient height, it is to be topped and allowed to mature for cutting. The time of maturity is ascertained by the leaves changing gradually their color, beginning at the bottom leaves, from their deep green growing color, to a yellowish green; but if this is not sufficiently obvious, and you deem your tobacco ripe, you may test it by crushing together the tip of any of the upper leaves, which, if it snaps, is a sign of its being ripe; but, on the contrary, if it does not snap, it is not fully matured. When ripe for the knife, it is cut down near the ground, leaving two suckers, which have been spared a week or two prior, ready to grow up and produce a second crop; and also a third crop may be realized in the same manner. The tobacco is to be conveyed carefully, in wide thongs of cowhide, to the house, to be hung up—a shed is preferred, with free space for ventilation beneath; and after tying the plants together, two to each string, and leaving space enough between them to insert a wooden peg, you hang them up by intruding them above each

rafter up to the ridge of the house, being careful not to hang them so near that they will touch or crowd each other in drying, or your tobacco will mould. Also, when the weather is moist you must make small fires enough under it to keep out the moisture, but not enough to heat your tobacco. When the leaves are perfectly dry, the whole are to be taken down and placed in a press for a few hours, the object of which is, if the tobacco is too dry to strip off without breaking the leaves, that they may become soft and pliable; but great care must be taken that it does not heat; and it must be strictly examined, by inserting the hand, to ascertain that it becomes not too hot. The press is made by putting rails or poles crosswise of each other, in form of a rack, and placing cowhides under, over, and around the tobacco, and placing upon it something somewhat weighty. It is then to be stripped leaf by leaf from the stock, and, being selected, the wrappers from the fillers, to be tied at the butts and prepared for market. It is sometimes usual to put it again in press after being stripped.

From the American Agriculturist.

CULTURE OF TOBACCO.

The growing of tobacco is becoming an important business in the valley of the Connecticut, and yields a better return to the farmer on rich land than almost any other crop. This crop was greatly increased the last season, and I think I do not exaggerate when I estimate the amount grown in the towns bordering on the Connecticut, between Hartford and Northampton, from 1,500 to 2,000 tons. The price the last season, for large growth, and in good condition, was eight cents per pound. We have two varieties—the narrow and the broad leaf. The latter is the most productive, and sells in market much more readily than the former.

Soil, preparation, and sowing.—We select for our tobacco plants a rich, moist (but not wet) spot, and sow the seed as early in April as the ground can be prepared for it. Our beds are well manured, made mellow and fine, and the seed should be sowed at the rate of one table-spoonful to the square rod, before the earth gets dry; after this it is raked, so that the dirt may stick close to the seed. It should not be covered, but let a man go on and tread the surface of the bed as hard as possible. The bed must be kept free from weeds. The plants should get leaves two or three inches long before being transplanted. They grow faster in the beds at first than in the field, and are less exposed to the cut-worm.

Transplanting.—We commence transplanting the fore part of June, and often set out the plants as late as the 20th or 25th. The ground should be made mellow and level. The broad leaf plants should be set in the rows two and a half feet distant from each other, and the rows be three feet four inches apart. If it rains at the time of setting, we take advantage of it, and get out as many as possible. If not, we make the hills, and pour into each about half a pint of water, and follow immediately after and set the plants. They will live as well, set in this way, in sunshine as in the rain. The ground should be looked over two or three times afterwards, and re-set the vacant plants.

After-culture.—As soon as the plants are well growing, we go through with the cultivator, and again fill up the vacant places. The crop

should be hoed three or four times without hilling the plants. When the green worms appear, they must be watched and killed, or they will in a great measure destroy the crop.

Topping.—Commence topping the tobacco when it is in the bloom, and manage to top as much as possible the first time going over, that it may all ripen at once. Leave about twenty leaves to the stalk, and make the field as even on the surface as possible. If you have late plants in consequence of re-setting, break them low, and they will grow faster and ripen sooner for it. The suckers should all be broken off and the plants kept clear of weeds till they are cut.

Cutting and curing.—We should never cut more than can be hung the same day and next morning, while the dew is on. After cutting, it should lie and wilt on one side, then turn it and wilt the other; then throw it into heaps of six or eight plants each, and let it lie till carted to the sheds, where it is hung with cotton twine on poles twelve feet long, and about twenty plants on each side. It must hang till the stem of the leaf is thoroughly cured to the stalk. It is then taken down in a damp day, (to prevent the leaves from crumbling,) and stripped and tied in three small hands, keeping the broken and poor leaves by themselves. It is then packed, and pressed hard with the hands, in a double row, with the butts out, and if not sufficiently cured in a few days, it must be shaken up and re-packed, to prevent heating. When fit for market it is brought in large quantities and pressed in boxes containing about four hundred pounds each, and sent to the seaports and shipped to foreign countries.

Value of poudrette.—I used one barrel of poudrette on my plants while on the bed, leaving a small piece without it. The effect was astonishing. The plants at the time of setting were twice as large where the poudrette was used as where it was not, and they were not as much attacked by the worms, which is an important consideration. I set the last season about two and a half acres in tobacco, which produced 5,100 lbs. I sold it for $408.

P.

South Hadley Falls, Mass., *March* 3, 1845.

We had the pleasure of visiting our intelligent correspondent above, last year, and saw his tobacco crop growing. We recently met with an enterprising farmer from Windsor, who estimated the crop grown the past year in the valley of the Connecticut and its vicinity at 5,000,000 lbs. He said he could get from 12 to 16 cents per lb. for his; and although it was used for a different purpose, he did not know why it was not as good as the Cuba, which sells from 25 to 35 cents per lb. Prime tobacco land rents high at present in the valley of the Connecticut—from $25 to $50 per acre per annum. A rich, friable, loamy clay is considered the best soil for this crop, which must be highly manured, and deep and well worked. We think it ought to be sub-soil ploughed, and that guano as well as poudrette would be an excellent manure for it. The latter is the most lasting, and is said to keep of the fly. Coarse barn-yard manure makes too rank a growth of stalk and leaf, and injures the quality of the tobacco; whereas poudrette, guano, and other fine and highly concentrated manures, would add to its aromatic flavor. We should be glad to see carefully conducted

experiments made the present season with these manures, on the tobacco crop. The different kinds might be tried side by side on separate rows, with a view of testing which was best for that particular locality and kind of soil. We should be pleased to learn whether the culture of the finest Cuba tobacco has ever been attempted in New England. This is frequently worth from 50 cents to $1 per lb.—*Ed. Agriculturist.*

From the N. Y. Farmer and Mechanic.

As the growing of tobacco is receiving attention, and is raised to good profit, I must give you an estimate of the cost to raise one acre, made by myself, with the help of friend L.; and he should know, as he has several acres which average one ton per acre, and sells at Warehouse Point for 8 cents per lb.—$160 per ton. Mr. L. says one ton per acre is a good crop; and probably more falls short than comes up to it. Now for the estimate:

Use of one acre of land, one year			$15 00
10 carts of manure, at $2 50	$25 00	one-half is	15 00
Carting and spreading	5 00		
Ploughing twice			3 00
Harrowing and marking			1 00
7,000 tobacco plants, sold at 50 cents			3 50
Holding and setting plants			3 00
Hoeing four times			5 00
Extra attendance to secure and kill worms			2 00
Topping and securing			4 00
Cutting and hanging up to dry			4 00
Stripping from stalk and packing			5 00
Rent of shed to dry in			4 00
Freighting to Warehouse Point			3 00
			67 50

Now $67 50 from $160 leaves a net profit of $92 50 per acre. What crop other than tobacco would make so good return? This is a fact worthy of consideration.

From the Southern Planter.

TOBACCO PLANTS.

Mr. W. W. Gilmer, of Albemarle, is so notorious for his uniform success in raising tobacco plants, that we were requested to obtain and publish his method of managing his beds. To an application to that effect, we have obtained the following answer:

"My Dear Sir: My plan for raising tobacco plants is the result of careful observation and inquiry for twenty years. All planters of common intelligence are able to pick the best location on their estates for plants; most of them are aware that some moist and some dry land should be prepared. I burn half in situations where water may be carried round in ditches—the balance on high ground. Early and hard burning all know to be best; yet many persons put off the evil day, and *scorch*. The land should be

made red-hot if possible, for at least two inches. We frequently chop with a grubbing hoe before burning, regulating the depth according to the soil; prepare the beds as soon as burnt; sow half the seed the middle of February—balance middle of March, on each bed; never put more than two-thirds of a spoonful of seed to the one hundred square yards. Many beds have more good-for-nothing plants left, after their owner has failed to pitch, than would have planted double his crop. By sowing at the periods mentioned, we avoid usually the danger of having the young plants thrown out by frost, and get as good roots as when sown in December or January.

"After the March sowing, cover the beds from one-eighth to one-fourth inch thick with chaff which has been used for bedding in stalls for several months; put in at first six or eight inches, and keep the horses well littered with it; about February take it out, and put it in a pen well sheltered. First of March take it to some clean floor, and beat it fine with a flail, then sow, fifteenth March, from hampers. The stalls should be plastered at least once a week freely, (farm pens also.) Cover the beds with brush as usual.

"I had this year a fine bed in an old field which had grown up, and never had more or better plants.

"The horses littered with chaff should be fed on corn and fodder, or some food clear of grass seed. The chaff manure is Dr. Gantt's idea, and I think it a long way ahead of guano and every thing else.

"We never move the wood. Burn out the bed at a single fire; put down large pieces to keep the wood from the ground, &c.

W. W. GILMER."

For the Southern Planter.

THE SPOT IN TOBACCO.

Mr. Editor: If any among the many who write for the Planter have found any means to prevent the spot in tobacco, or to stop it after its appearance, you would be doing us great service in this section of country to publish it in the Planter. Perhaps you have done it heretofore; if so, please give it another insertion for the benefit of your new subscribers. If the matter has not been discussed already, be so good as to call the attention of your contributors to it. We would like to find out pretty soon, as the season for tobacco to spot is just at hand. Your attention to this matter will very much oblige

Your humble servant,

JESSE J. KELLY.

Granville County, N. C., *July* 31, 1845.

We have published many valuable communications on the subject of tobacco, but none have met with more general approbation than those from the pen of Mr. N. A. Venable. Upon this important subject of the *rot*, he says:

"Passing over the time of planting, priming, topping, &c., on which our writer is sufficiently explicit, we come to the *casualties* or *diseases* to which the crop is subject. The first mentioned by our writer, and by far the most serious, is the spot or firing, or more properly the rot. This is caused by too much rain, and is more liable to occur on sandy soils, and less so on

those that are stiff, red, or thirsty. It is of much rarer occurrence of late years than it was formerly, which is ascribable, doubtless, to the improvements in management and cultivation which experience has suggested. The mode formerly practised was to cultivate the crop almost level, and to keep the soil between the hills loose and well broken; under this mode of cultivation, immense losses were sustained almost yearly by fire. But by adopting just the reverse of this, by scraping up carefully with the hoe all the loose earth among the hills, as deep as the plough has gone, and throwing it on the hills, and leaving the ground among the hills as hard, if possible, as a path, the leaves of the plant, when it is large enough to take the rot, will shield the hill from the rain, and throw the water off on the hard ground, which soon runs off, and the crop is protected. A sufficient quantity of vegetable matter turned into the soil will also do much towards preventing this disease. This is proved by the well-established fact, that the first crop on a clover and herdsgrass fallow, where the land is very sandy, does not fire, whereas the second or third are almost certain to do so, unless some vegetable substance is turned into the soil; and hence such land (sandy loam, river or creek flats) should not be cultivated two or three years in succession, let them be ever so rich, without applying some vegetable matter or other. These are matters of the greatest importance, for there is no disease more destructive to the tobacco crop than the one we are considering; and I verily believe, if we could have cultivated our crop last year in this way, as unfavorable as the season was, we should have escaped the disaster. But the summer was so unusually wet, we were unable to cultivate our crop in our usual way, and it is the first time we have suffered with the disease. I would not be understood to say that it can always be prevented, but I do believe that it can be generally done, and in the way I have above indicated. I will only add that I very much question the propriety of ever ploughing the crop after the plants have got large enough to take the rot, on account of the loose earth that is thrown up."

Upon these remarks of Mr. Venable appeared the following commentary, in the May number of the Planter for 1843. We should be pleased to hear the subject further discussed:

Messrs. Editors: I have been reading with much interest the several communications upon the cultivation of tobacco from the pen of Mr. N. A. Venable. I have been struck with some of his positions with regard to the mode of cultivation to prevent fire, (or rot, as he terms it.) The cause to which he attributes it—that is, too much rain—I think correct; but to prevent its ruinous consequences, I resort to precisely the opposite course, namely, ploughing deep and thoroughly, so as to admit the rapid absorption of the water, which by his mode will either be altogether prevented or effected only at the expense of a gulley between each row, which must carry off all the strength of the manure deposited in the hill. If he will, on the first indications of the spot in tobacco, run his coulters deep and well, both ways, so as to break the ground thoroughly, disturbing the roots of the plant sufficiently to cause it to flop in the sun, he will, nine times out of ten, arrest it altogether, and greatly increase the product of the crop. This I never fail to do after the crop is nearly all topped, taking the heat of the day, and substituting a pair of light stretchers instead of the swingletree. I have been able effectually to divest myself of that troublesome insect the

cut-worm, by letting my hogs run in the tobacco lots for a week or ten days previous to the last ploughing, before bedding or hilling; it will be found effectual in all cases, for I speak from experience.

This being the first time I have taken pen in hand, I shall not touch on some other subjects relative to the tobacco crop until I see the fate of this, as I have no vanity to gratify—only a wish to be useful.

Yours, A Planter.

Nelson, *April* 7, 1843.

For the Louisville Journal and Dollar Farmer.

TO THE TOBACCO PLANTERS OF KENTUCKY AND INDIANA.

The undersigned having closely observed the tobacco market in the city of Louisville for the last two years, and feeling an interest in the success of that industrious and enterprising portion of our citizens, the tobacco planters, would beg leave to make to them a few suggestions, which may possibly be of some service, if it is only by attracting their attention to the subject.

There is a great amount of labor lost by half cultivating, half curing, rough handling, and general bad management of the tobacco crop, by a large portion of the planters. It is now pretty well ascertained that the crop of this year throughout the United States is much shorter than it has been for several years past: particularly in Virginia and Maryland, the crop is said to be short. The crop in Kentucky and Indiana, though something smaller than usual, is of better quality. As the tobacco market in Louisville is each year increasing and growing in importance, we may expect many of the dealers in the article in the east to come west to make their purchases. Planters may expect very fair prices, provided they will be more careful in handling and putting up their crops. As the crop is now housed, I will speak of the manner of putting it up for market. 1st. The entire crop should be divided into three qualities: the largest and finest leaves making the first quality; the shorter leaves, that are sound and clear of the ravages of worms, the second; and the ground leaves, or lugs and worm-eaten, the third quality. All of the first should be as near the same length as possible, and the same uniformity of length should characterize the second quality. If one portion of the crop is coarse, heavy leaf, and the other fine and light, they should be divided and put up accordingly, because the planter often loses much by mixing the cigar leaf with the heavy coarse leaf. There is often a great error committed both in the size and shape of the cask; also in pressing too hard. The casks are often too long, too small in the head, and with too large a bulge. When the bulge is too large, the hogshead will be very uneven and rough in appearance, when stripped for inspection and sale. When the hogshead is small in the head, and the leaf long, the sample cannot be drawn without breaking the ends of the leaves, which very much defaces and injures the appearance.

Much of the tobacco brought to this market is injured by hard pressing, to the amount of at least one dollar per hundred pounds, particularly that which comes from Green and Marion counties. The hogshead or cask should be four feet six inches in length, and three feet six inches in breadth

in the head, with a bulge only sufficient to hold the hoops well. Such a sized cask will contain, without too hard pressing, from thirteen to fourteen hundred pounds of net tobacco. The cask should not weigh more than one hundred and fifty or one hundred and sixty pounds, instead of two hundred pounds and upwards, as is often the case even when the tobacco is hauled from sixty to eighty miles, at an expense of fifty cents per hundred pounds for the unnecessary timber. Ash timber should be used when it can be had, because it is light and strong, and white and neat in appearance.

With a view to an improvement in the cultivation of the crop, we gave last spring, at the Louisville warehouse, premiums to the amount of one hundred dollars; and we expect to do the same next spring, with a slight alteration; and that is, to require each planter who offers a hogshead for premium to pay one or two dollars entrance money, which amount will be added to the amount of premium money. All the premiums except one were taken last spring by citizens of Hart county, Kentucky. Will it be the case again? What say you, planters of other counties, and of Indiana?

A great deal of our Kentucky tobacco is taken beyond the Alleghany mountains, manufactured into chewing tobacco, and brought back and sold in Kentucky as Virginia tobacco. All that is necessary to have a great abundance of it manufactured in our own State into a fine article, is, that the planters furnish our enterprising manufacturers with a good material, which they are entirely able to do.

ROBT. K. WHITE.

TOBACCO.

By a recent order of the Lords Commissioners of her Majesty's treasury, all leaf tobacco, in an unmanufactured state, may be imported from the United States of America into Great Britain and Ireland in packages of the same weight in which the same description of tobacco can be legally imported from the places of its growth. They have also authorized that the requisite alteration may be made in the law in the next customs amendment act, for to allow tobacco the produce of Mexico, America, South America, or the islands of St. Domingo and Cuba, to be imported into the United Kingdom, in bales containing eighty pounds weight each, from any place from which it may be legally imported for home use. Their lordships have also allowed tobacco the produce of Trinidad to be imported into the United Kingdom, in packages of the same size as those sanctioned for tobacco the produce of South America and St. Domingo.

From the Union.

TOBACCO IN GERMANY.

Letter from one of the heaviest tobacco dealers in Europe, to his friend, the late consul of the United States at Bremen:

BREMEN, *December* 26, 1845.

HONORED SIR: During your stay here, we several times had the pleasure of conversing with you, and furnishing some details about your tobac-

co trade. We therefore hope that it may not be called an intrusion upon your valuable time, if we address you a few lines to complete the statistics of this branch of our intercourse with the United States for the past year.

Imports here have been large, as might be expected from so abundant a crop as that of 1844–'45 proved to be. They reach—

	1844.	1843.	1842.
24,226 hhds. Maryland and Ohio, against -	16,978	18,483	20,106
1,571 do Virginia - - -	5,092	5,541	6,268
11,749 do Kentucky - - -	9,736	7,485	9,595
5,361 do stems - - - -	4,753	3,969	3,852
42,907	36,559	35,178	39,821

Sales have also increased considerably, and reach—

13,142 hhds. Maryland, against - -	11,917	10,481	12,234
2,544 do ground leaves - - -	1,250	1,501	1,079
2,229 do box - - - -	1,524	1,290	1,276
6,634 do Ohio - - - -	2,806	2,838	3,763
3,090 do Virginia - - -	4,202	4,360	5,473
10,570 do Kentucky - - -	9,569	6,481	9,127
4,106 do stems - - - -	5,563	3,447	5,087
42,315	36,831	30,398	38,039

And stocks at the end of the year in first hands, here, are—

5,922 hhds. Maryland and Ohio, against -	6,242	6,312	4,123
2,155 do Virginia - - -	3,666	2,738	1,557
3,340 do Kentucky - - -	2,229	2,022	1,018
1,330 do stems - - - -	209	969	447
12,747	12,346	12,041	7,145

The business during the last twelve months has had a more regular character than we have almost ever known it to have. The quality of the crop proved a desirable one, and better than any since 1840, particularly in point of *color*, which brought our dealers freely into the market; and as manufacturers also showed themselves anxious to secure stocks of this growth, all supplies found a ready sale at remunerating prices until the end of November, when the market became dull, various causes combining to render it so. Manufacturers had got into stocks; money became exceedingly scarce in Europe, in consequence of the mania to speculate in railroad stocks; which, however, has not extended to Bremen, where the horror to enter into anything like a paper speculation continues undiminished; and it was moreover put beyond a doubt that the grain crops in Europe, although we may not actually call them short, are far from being abundant, and will hardly suffice for the twelve months to come.

In August, reports of a short crop of tobacco, bearing the semblance of truth, reached our place from the United States, which caused quite a stir, and some lots of ordinary tobacco, probably about 2,000 hogsheads, were

taken by speculators; but, upon the whole, the business has been left to its legitimate course, and we again find it proved that nothing will go so far towards increasing sales as good qualities. Desirable tobacco is saleable even at this moment, whilst anything bordering upon ordinary cannot be sold even at ruinous rates. Your planters cannot devote too much attention to this fact, as nothing but their producing a better article than the inland (German) tobacco will increase the sale. We consider this of *much more* importance than a small reduction of the "Zoll-Verein" duty, which, for the consumer, amounts to but a very small item, whilst a better pipe of tobacco for the same money will so accustom him to the United States tobacco that manufacturers will be compelled to prefer it to the miserable stuff growing in our country. Since some years, a kind of reaty tobacco, grown in Mason county, has made its appearance, which promises to become a very important article in the manufacture of cigars. It is beginning to supersede Domingo tobacco. We saw 1,000 hogsheads sold this year at 8-22 groats. The average prices paid for tobacco are as follows:

					1844.	1843.	1842.
Maryland, from	$3\frac{3}{4}$ gts.	to $10\frac{1}{4}$ gts.,	average $6\frac{1}{16}$,	against	$5\frac{5}{8}$	$6\frac{1}{32}$	$6\frac{6}{16}$
G. leaf, from	$5\frac{1}{2}$	do $10\frac{3}{4}$	do $7\frac{1}{8}$	do	$7\frac{1}{24}$	$7\frac{1}{16}$	$8\frac{1}{4}$
Box, from	$5\frac{7}{8}$	do $20\frac{1}{2}$	do $9\frac{7}{8}$	do	12	$10\frac{5}{8}$	$12\frac{5}{6}$
Ohio, from	$4\frac{6}{8}$	do $15\frac{1}{4}$	do $7\frac{3}{4}$	do	$9\frac{3}{8}$	$8\frac{1}{8}$	$8\frac{1}{2}$
The prices of Virginia tobacco have been from					$2\frac{5}{8}$	to $8\frac{1}{2}$	av. $4\frac{1}{2}$
The prices of Kentucky and Mason county, from					$2\frac{3}{4}$	" 17	" 5

Another kind of tobacco has grown into importance this year, viz: Florida, which is extensively used in cigar making. It is a most abominable article as to taste or smell, but being splendid wrapper leaf for the eye, and much like Havana, it will take the field against the latter. It is imported in boxes, averaging 300 pounds, and we sold some ourselves at $1\frac{1}{4}$ rix dollars per pound. The common is not worth above 4.6. There were imported—

In 1843 - - - -	- 125 boxes, and nearly all sold.
1844 - - - -	- 200 boxes, and nearly all sold.
1845 - - - -	- 780 boxes, and nearly all sold.

It may be of interest to add some particulars about the other kinds of tobacco, which are brought to market in bales, averaging 120 pounds. The imports, which are about equal to the sale, were:

				1842.	1843.	1844.
6,490	bales	Havana	against	17,275	20,425	18,709
16,560	do	Domingo	do	9,762	10,145	7,123
21,990	do	Porto Rico	do	23,661	28,094	22,641
2,490	do	Varinas	do	8,192	9,025	10,993
6,560	do	Brazil	do	1,490	200	
4,950	do	Java	do			

Havana, Varinas, and Brazil cannot be driven out of the market by United States tobaccos, as they have a particular flavor, and cannot be dispensed with. Domingo finds a rival in Mason county and Florida; and Port Rico in Maryland. The growth of this island is an item, and would be a formidable rival but for two causes—firstly, the freight is too expensive, as it cannot be possibly brought here for less than $1\frac{1}{4}$ rix dollars per 100 pounds, whilst we regularly have Maryland at three quarters, and some-

times at three-eighths per cwt., and Kentucky at three-eighths and five-eighths; and, secondly, in consequence of the export duty in Porto Rico being another one-fourth. The cultivation in Porto Rico has much increased of late, and we bought several cargoes this year at 4 for prime, and 3 for second quality, &c. It appears planters find these rates remunerative. As we can pay them in linens and other manufactures, we almost give this trade the preference to that with your country, whenever we have a heavy cash balance against us.

As regards stocks of tobacco here, we find them larger than they have ever been, and should set them down in all hands at 50,000 to 60,000 hogsheads; of which about 20,000 hogsheads common are held by speculators, 12,747 hogsheads in first hands, and the balance held by dealers.

On the 29th of January the French government will enter into contracts for the supply of 300,000 kilograms of Kentucky tobacco, 200,000 kilograms of Maryland, 1,880,000 kilograms of Virginia, 1,400,000 kilograms of Kentucky, and 2,200,000 kilograms of Maryland. Tobacco, in this country, is a government monopoly, and these large quantities are required for sale.

From Wilmer and Smith's European Times, January 4, 1846.

LIVERPOOL ANNUAL TOBACCO REPORT.

The sales for the month amount to 1,137 hhds., of which 192 were Virginia leaf, 345 stemmed, 117 Kentucky leaf, and 483 stemmed. Of these, 155 Virginia leaf, 219 stemmed, 39 Kentucky leaf, and 48 stemmed, were taken for Ireland; 9 Virginia leaf and 53 stemmed, for Scotland; 1 Virginia and 33 Kentucky leaf for exportation; and the remainder, or 27 Virginia leaf, 73 stemmed, 45 Kentucky leaf, and 435 stemmed, by the trade. The imports 1,743 hhds.; the deliveries 1,066 hhds., of which 376 were for home use, 276 coastwise, 27 for exportation, and 387 for Ireland, and there now remain in the warehouse 1,596 Virginia leaf, 3,213 stemmed, 2,804 Kentucky leaf, 5,142 stemmed, 13 Marylands, 24 other sorts, and 4,530 hhds. unsampled, of which the greater proportion is stemmed.

The import of the year has been 13,370 hhds.; of which 1,426 were Virginia leaf, 2,509 stemmed, 1,037 Kentucky leaf, 3,855 stemmed, 13 Marylands, and 4,530 hhds. unsampled; of which 2,109 are from Virginia, 2,415 from New Orleans, and 6 from New York.

The deliveries of the year have been 12,341 hhds., viz.: 193 Virginia leaf, 288 stemmed, 332 Kentucky leaf, and 355 stemmed, to the trade; 234 Virginia leaf, 974 stemmed, 143 Kentucky leaf, and 1,159 stemmed, sent coastwise; 269 Virginia leaf, 51 stemmed, 1,700 Kentucky leaf, and 28 stemmed, for exportation; and 1,107 Virginia leaf, 1,529 stemmed, 478 Kentucky leaf, and 292 stemmed, to Ireland.

The sales of the year amount to 14,424 hhds., against 13,045 in 1844, and 12,739 in 1843. They consisted of 2,063 Virginia leaf, 3,003 stemmed, 2,902 Kentucky leaf, 6,435 stemmed, and 21 Marylands; of which 1,263 Virginia leaf, 1,864 stemmed, 598 Kentucky leaf, and 748 stemmed, (4,473 hhds.,) were taken for Ireland; 29 Virginia leaf, 485 stemmed, 3 Kentucky leaf, and 334 stemmed, (851,) for Scotland; 403 Virginia and 1,783 Kentucky leaf, with 13 Marylands, (2,199,) for exportation; 30 Virginia leaf, 133 stemmed, 67 Kentucky leaf, and 677 stemmed, (907,) for re-sale; and

338 Virginia leaf, 521 stemmed, 451 Kentucky leaf, 4,676 stemmed, and 8 Marylands, (5,994 hhds.,) by manufacturers; and there remain for sale 1,220 Virginia leaf, 2,627 stemmed, 2,170 Kentucky leaf, and 4,506 stemmed, to which will have to be added 4,530 hhds. yet to sample.

The weight of unmanufactured tobacco, upon which duty was paid in 1843, was 22,828,467 lbs.; in 1844, 24,250,010 lbs.; and this year, 25,852,199 lbs.—showing an increase over the previous one of 1,602,189 lbs.

As appears above, the sales of the month, though not large, have been fair, and the purchases confined principally for Ireland and the home trade; no speculation, and but little inquiry for export purposes.

About one-half of the new, now sampled, comprising an equal proportion of Virginia and western; the former proved, as expected, much better than the previous import; the latter good in every way, and both generally in fine order and condition.

In prices we make no alteration, the finer and most colory descriptions still commanding extreme rates; though, with ordinary and middling, holders are much easier than at the earlier part of the season; and unless some difference should arise between this country and America, (with a large stock, and manufacturers pretty well supplied, as is the case at present,) we cannot see any prospect of an improvement on the present quotations.

In London the stock is	27,300 hhds.	against	31,600	in 1844.
Ireland	2,350	"	2,000	"
Scotland	1,300	"	1,172	"
Bristol, Hull, and Newcastle	1,738	"	1,436	"
Here	17,302	"	16,273	"

Virginia.	Leaf.	Stemmed.
The import into this port for 1843, was	1,733	3,217
Do do 1844	1,446	3,381

Kentucky.	Leaf.	Stemmed.
Do. for 1843, was	6,085	2,687 and 10 Marylands.
Do. 1844	2,125	5,476 and 9 " and 4 other sorts.

The stocks on the continent not yet ascertained, but large.

JAMES BROWN, SON, & CO.

Liverpool, *December* 31, 1845.

APPENDIX No. 11.

COTTON.

For the Southern Cultivator.

ON THE CULTURE OF COTTON.

Mr. Camak: Having seen the report of Mr. R. P. Sasnett and others, who have been experimenting upon Dr. Cloud's plan of planting cotton, and having, in 1844, made a small trial myself, and discovering that my result approached so near in quantity that of Mr. R. P. Sasnett, I am encouraged to report, through your very useful periodical, the quantity of seed cotton which I grew per acre. The land, in a natural state, is a sandy ridge, had been cultivated several years, and was consequently somewhat exhausted; perhaps six or eight hundred pounds might have been grown upon it, unassisted by manure. In 1843 it was not cultivated, but was used as a pasture for calves. In February of last year I had the land broken deep with a scooter plough; after which, I hauled out my manure and laid it in piles at suitable distances. On the 2d of April I laid off the rows at the distance of two feet and a half the narrow way. This was performed with a very narrow plough. On the 3d of April the rows were run off the wide way, four feet, with a shovel plough, and the manure deposited in the check, in such quantity as to nearly fill the shovel-furrow at each hill; after which the bedding or ridging was performed the wide way with a very simple kind of turn plough, leaving enough of the middles unploughed to retain the small scooter marks as guides in planting. On the 4th of April the ridges were opened with a small scooter and light stock, the seed rubbed in leeched ashes, and a few dropped in each hill and covered with the feet. The ground being dry at this period, the seed did not vegetate till after the fall of a shower, which was 15th April. After the rain the middles were turned out. As soon as the cotton was up it was hoed, leaving three or four stalks in a hill. The second working was performed by running a small plough round the cotton, and leaving the middles unploughed, and hoeing out, leaving two stalks in each hill. In June the middles were ploughed, and the cotton hoed. At this period I discovered that the cotton was not inclined to branch properly; and, consequently, I thinned it down to one stalk in a hill.

At this time the plants were blooming, and on many stalks several bolls were found. Early in July I ploughed and hoed the ground very lightly; which finished the culture. On the 16th July I topped the cotton plants; it branched so as to fill up the row the wide way, and produce two thousand and thirty-four pounds per acre. Had the thinning been performed in proper time, I doubt not but that the product would have been larger. This fact is detailed as an error in the cultivation. One stalk in a hill is enough; and, if thinned as soon as possible, everybody knows that fruit will be produced the sooner.

The manure used was "compost," prepared from stables. The kin l of

seed planted was Rio Janeiro. I shall say something of this cotton in my next.

Yours,

MILES SCARBOROUGH.

MOUNT PLEASANT,
Meriwether county, April, 1845.

From the Washington "Union" of March 5, 1846.

COTTON MANUFACTURE.

We are permitted to copy the following interesting paper upon the cotton manufacture of Austria, from letters addressed to the Commissioner of Patents by Charles L. Fleischmann, esq., late of the Patent Office, now travelling in Europe. It is extracted from letters dated "Vienna, Austria, January 15, 1846."

Austrian cotton manufactures, &c.

The manufacture of cotton goods, although laboring under a great many disadvantages in regard to perfect machinery and a less experienced and skilful working class, has developed itself since the beginning of this century in one of the most important branches of Austrian industry.

In the year 1801 a Baron Kobliesky introduced into Austria the first English cotton spinning machines, and established the first cotton factories, which have since increased to 175, with 1,300,000 spindles. Some of these factories are now extensive; as, for instance, that at Pattendorf, which has 47,000, and that of Truman 32,000 spindles, producing yarn above the No. 100.

Within fifteen years the importation of raw cotton has increased five-fold, viz: in the year 1828, it amounted to 65,000 cwt.; in the year 1831, it was already double; in 1836, it reached 207,985; in 1837, 223,545; in 1840, 302,694; in 1841, 248,121; and in 1842, 321,377 cwt.

In the year 1834 the government reduced the import duty from 3 florins 30 kreutzers to 1 florin 40 kreutzers per cwt., in order to encourage this important branch.

The above-stated numbers of spindles produce yearly 214,896 cwt. of yarn and thread of the following numbers: from 1 to 30, 12,613,074; of 32 to 60, 8,313,327; of 62 to 100, 283,398; above 100, 17,410, and thread, 262,410; in all, 21,489,619.

In the early stage of the development of this branch of industry, the importation of yarn to No. 50 was entirely prohibited, but afterwards admitted under a duty from 30 to 81 florins, according to the degree of fineness of the article; in the year 1833 it was reduced to 20 florins; and in March, 1845, to 10 florins, or about $5 per cwt.

This reduced duty increased the importation of fine yarns, in which Austria cannot compete with England. In 1831, it was only 6,773; in 1833, 10,670; in 1838, 57,766; and in 1842, 61,411 cwt.

Austria imports three different kinds of cotton—the Macedonian, Egyp-

tian, and American. The Macedonian is used for the most common yarn, or the numbers from 1 to 10; the American for the numbers from 12 to 30; for the fine numbers from 32 to 60, partly American and partly Egyptian; and for the numbers above 60, the best Egyptian.

The average price of the different kinds of cotton stood, in 1841—Macedonian, 32 florins; Egyptian, 48 florins; and American, 37½ florins, per cwt.

The price of Egyptian or Maco cotton has, since 1841, diminished in price, and in 1844 it could be bought for 27 florins per cwt.; the middle quality of American fell in the same period from 37½ florins to 25 florins per cwt.

The Egyptian cotton is of great importance to Austria. In the first place, it is of superior quality, and can be used for the finest numbers; and, secondly, it employs its vessels in commerce with Egypt for the transportation.

The whole amount of imported cotton can be estimated at one-eighth Macedonian, two eighths Egyptian, and five-eighths American—computed at a value of 9,860,000 florins.

When to this sum for raw cotton the expense of manufacturing into yarn is added—amounting to 214,896 cwt., valued at 5,260,000 florins—the value of yarn produced in the Austrian manufactories amounts to 15,120,000 florins.

The low rate of labor has prevented the general introduction of power-looms. Most of the yarn is woven into different goods by hand; and, according to the official statements, there are turned out 5,800,000 pieces, at a value of 20,760,000 florins.

Great as the increase of manufactured cotton goods appears within twenty years, there is yet room for a far greater extension. The yearly consumption of cotton goods amounts to 218,000 cwt., of a population of 36,000,000, or two-thirds of a pound or six yards per head; which is considerably less, when compared with the countries of the German league, where it amounts to two pounds per head.

The extensive production of English cotton yarn stands to that of Austria as 1 to 12; to that of France as 1 to 4; and to those of the German league as 4 to 3. The importation of cotton yarn into Austria, which amounts to 47,337 cwt., was in the German league three times greater; in France, very small.

From the Union.

COTTON IN INDIA.

New York, *September* 22, 1845.

The Zenobia, which arrived at this port on Saturday morning last from Calcutta, East Indies, brought home one of the American cotton planters, who, some five years since, entered the service of the honorable East India Company as a superintendent of cotton farms in their extensive experiment, made to grow American cotton in that region, and to improve the cultivation of native cotton. I have had much conversation with Mr. T., who went from Mississippi; and after having served the government for five years, the term of his engagement, has returned, as stated, in the Zenobia. He has communicated to me much valuable and interesting information in relation to India.

He estimates that the experiment has cost the government about $500,000, and that it has resulted in the most complete and signal failure.

In 1840 an agent of the government came to the United States, and repaired to Louisiana and Mississippi, where the growing of cotton has been carried to the greatest state of perfection, and where he engaged ten Americans who had been employed in superintending cotton estates in that section of the Union for several years. They were well recommended by the most respectable planters. They left with the agent for India, via England, and took with them large quantities of the best American cotton seed, agricultural implements, cotton-gins, presses, &c.

The planters were engaged at an average salary of about £300 each, with an allowance for subsistence of £100 more. Each entered into a contract to remain in the service of the company five years, and to conduct the experiments in such parts of India as the government should point out. Of the ten persons thus engaged, three, after the first year, returned home, being paid their salaries up to the time of leaving, but were left to bear their own expenses home; while, according to the agreement, those who remained five years were to have all their expenses borne from America to India, and from thence, at the expiration of the service, back to the United States. Seven of the party remained to the end of their engagement; one of whom is Mr. T., who has just arrived in the Zenobia.

He says, on reaching India their party were distributed to different parts of the Indian empire, in order that the experiment might be tested in reference to the different soils and varieties of climate in that vast empire.

One (Mr. T.) was placed at Calpee, in the district of Bundelcund. Another was stationed at Goruckpore, under the Napal hills; another in Dooab; another was located in Soomapore; another at Humeapore, in the province of Banda; another at Raatch, in Bundelpore; others in Coimbatore and at Surat, on the western side of the peninsula.

After experimenting a year or two at each place without a prospect of success, they were changed to other localities, so as to give every district in India, as far as possible, a trial. Mr. T. was changed from Bundelcund to Rungpore, North India, near the base and in full view of the Himalaya mountains, which were covered with perpetual snow. Others were changed to Dahwar, in the southern Mahratta country.

The American planter placed at Raatch, during a rebellion which commenced with the Decoyts, (robbers) had his premises attacked, his houses sacked and burnt, barely escaping with his life and the clothes he wore.

In every part of India where the Americans tried the cultivation of cotton, and endeavored to instruct the natives in the best mode of culture, they most signally failed. Those who remained used every exertion to succeed, as they were liberally paid, having every facility granted that they could ask, with the expectation of being handsomely rewarded if they succeeded.

Mr. T. thinks the two great and insuperable difficulties in the way of cultivating cotton in India are attributable to the two great extremes of *dry* and *wet weather*, either of which is peculiarly fatal to cotton. During the continuance of the rainy season, the cotton plants grow with unwonted luxuriance and rapidity, to be as suddenly checked and cut off by the intense heat of the sun which pours upon them during the succeeding season. When the dry weather sets in, the sun ripens the bolls prematurely, when apparently not more than half grown, while the leaves of the plant are crisped and burnt to a brown color by the intensity of the solar heat.

In lower Bengal the rainy season commences late in May, and continues till October. In central India the rainy season begins about the middle of July and lasts till from the 1st to the 15th of September.

In lower Bengal as much as 76 inches of rain usually falls in 12 months. In central India no crops can be anticipated with much less than 13 inches of rain. Eleven inches never fails to result in a famine, which is dreadful in its effects upon the natives.

In addition to the unconquerable difficulties of the climate, the cotton plant is exposed to the fatal attacks of destructive insects. There is one which lays an egg in the flower of the plant. Before the boll matures, the worm forms within it, which feeds upon the green and tender fibres of the cotton, eating out all the cotton within the boll before it matures, leaving only a lock or two in some bolls, or pods, while in others not a fibre is left. In some parts of India it is also subject to the attacks of white ants, which cut down the plants while young, or attack the young pods and cut them off.

All that the Americans could do with their best exertion only enabled them to raise, on the average, about ten pounds of clean cotton to the acre from the best American cotton-seed, and only seventy pounds of clean cotton to the acre from native India cotton-seed.

Mr. T., before leaving Mississippi to go to India, superintended a cotton estate near Rodney, in that State, in 1839, on which he raised over nine hundred pounds of clean cotton to the acre. He says that year he made a fine crop, actually sending to market two hundred bales of good cotton, averaging four hundred and fifty pounds each, from ninety-six acres of land. What a contrast this to cropping in India!

Mr. E., one of the American cotton growers who went to India, and was stationed at Goruckpore, put two hundred acres in cotton, from which he gathered only two hundred pounds of clean cotton. The most those sent to Coimbatore could do was to raise, in a favorable year, two hundred pounds of seed cotton to the acre—equal to about fifty pounds of clean cotton. The most Mr. T. could do was to raise, the first year, ten pounds of clean cotton from American cotton-seed of the Mexican variety, (the best) and seventy pounds of native cotton, to the acre. He says the American seed carried out from about Rodney (the best in America) deteriorated every year; the staple or fibre growing shorter, while the yield grew less. It is his firm conviction that if the American seed be planted over and over again in the same soil, in India, in *five years* it will totally cease to mature any cotton whatever. He also says, by changing it to other districts, it may be made to yield something a few years longer, but would ultimately run out.

From the Southern Cultivator, July 4.

AMERICAN COTTON IN INDIA.

It appears, from a report of the Bombay Chamber of Commerce, that the experiments in growing American cotton in India have not been entirely unsuccessful, particularly in the neighborhood of Hyderabad, under the superintendence of Captain Meadows Taylor. The following is an extract from the report of the committee of the Bombay Chamber:

" Your committee place in the appendix to the present report the letters of Captain Taylor relative to the samples, which give a very favorable

account of the progress making in the culture of New Orleans, Sea island, and Bourbon cottons. It is gratifying to perceive that the native growers are engaging actively in the cultivation of these varieties, and that instead of being with difficulty persuaded to make the smallest experiment—as has too often been the case before in other localities—they evince the greatest eagerness to obtain seed for sowing. The crops of Bourbon and Sea island on the bank of the Krishna are described as most luxuriant, and the success of the New Orleans appears to be beyond a doubt. Captain Taylor states that he has given directions for the whole of the cotton grown from the seed furnished to be collected and sent to Sholapore; and he adds that he purposes afterwards forwarding it to Bombay, in order to ascertain its value in our market. Your committee trust that the time is drawing nigh when we shall be able to calculate on a regular supply of such cotton. There can be no doubt that it would fetch a good price here for shipment to the home markets, and that it would amply remunerate both grower and dealer."

From the Gardeners' Chronicle, August 30, 1845.

CULTIVATION OF COTTON IN INDIA.

In resuming the subject of the cultivation of cotton in India, I must request your attention to an error which has crept into my communication. I had stated that the American species—that is, gossypium peruvianum and G. barbadense—though long introduced into India, still retain their distinctive characters. I then mentioned some corroborative facts, and concluded by stating that these facts show "persistence" of character, even in the midst of the Indian species. Your printers have made me say "perverseness" of character, which is a manifest contradiction to what was before said. I am glad, however, of recalling attention to this part of the subject, hoping that some of your correspondents may say something respecting the influence of different species of the same genus in hybridizing each other when grown in large quantities in the same open country. I have said on each other, because if the Indian species, from their vicinity, deteriorate the American species, these, on the contrary, ought to have some influence in improving the species indigenous to India. Some, indeed, are disposed to look with hope in this direction. Dr. Burn, indeed, in the very last letter, dated in May, which I received from him, says: "I am full of hope that something good may be obtained by crossing the foreign with our native cottons." In the mean time, however, he has made an experiment in crossing the two Indian species with each other. Of these, G. arboreum, as its name indicates, grows to a tree—bears comparatively little cotton; but this little is of a fine silky nature, and comparatively long in staple: the other species, G. herbaceum, which ought rather to be called G. indicum, as it will grow into a shrub, though only herbaceous in the south of Europe, is the source of the different cultivated varieties of cotton in different parts of India, some of which are of very excellent quality, as I hope afterwards to show. I give the results of Dr. Burn's experiment in his own words, which were communicated in a letter to Col. Sykes, and which has been lithographed at the India House, and of which I send you a copy, with colored drawings of the plants:

"The plant from which this is a specimen was sown at the beginning of the monsoon, in July, 1844, along with other plants of the G. arboreum. It grew up and ripened its produce; but it differed from them in habit considerably. They grow and blossom all the season, from November, until checked by the heat in April. It blossomed and yielded all its produce in the space of two months, as the G. h. does, and it was free from the chief fault of the G. a., viz: that of yielding too small a quantity of produce. In short, it had all, or nearly all, the good qualities of the parent plants. The plant grew to the height of six feet, and the lower lateral branches, four in number, were two feet in length each; the remaining ones being shorter gradually up to the top of the plant. The number of blossoms was 60; but only about 50 remained to yield produce; the others falling off. The color of the stem and other parts was greener, like the G. h., and not so black or dark colored as the G. a. The whole plant was also more hairy than the G. a., and resembled in this respect G. h., the most hirsute of all the varieties of the genus gossypium. The color of the blossoms was chiefly red, but at the roots of the petals the yellow color of the G. h. flowers was vivid, and more distinct than is shown by the dried specimen. The produce from the 50 bolls weighed equal to four rupees and three-quarters, or 855 troy grains; and for the sake of comparison in results, an equal weight of produce from G. a. was examined at the time along with that of the cross plant. The results were as follows:

Cross-plant wool, grains - - - -	$239 =$	28	per cent.
seed, grains - - - -	$607\frac{1}{2} =$	71	"
loss and dust, grains - - -	$8\frac{1}{2} =$	1	"
	855	100	
G. arboreum wool, grains, - - -	$191\frac{1}{4} =$	$22\frac{1}{4}$	per cent.
seed, grains - - - -	$658 =$	77	"
loss and dirt, grains - -	$5\frac{3}{4} =$	$0\frac{3}{4}$	"
	855	100	

"This shows clearly that improvement as to quantity of wool has been one result of the crossing. 28 per cent. is, I believe, equal to the yield of the best New Orleans produce in America; and, in this instance, the quality of the wool, in my opinion, is quite equal to the best* New Orleans to be found in the English markets. It is superior to the best Broach or "Surats." One fact, however, should be noticed—the yield of the G. h. here, on fallow land, is commonly 33 per cent. The G. a. and G. h. are eminently suited to the climate here, which none of the foreign varieties are. A knowledge of the climate, as to distribution of moisture, is the grand desideratum in India for successful cotton culture. The average fall of rain at Broach, for 1843 and 1844, was 38 inches—$31\frac{3}{4}$ per cent. The average of Bombay, as given, I believe, by Mr. Noton, is $76\frac{1}{2}$ inches; showing an excess over Broach of $38.18\frac{1}{4}$, or double in amount. Now, the two last seasons at Broach are considered to be above the average fall, and too much for successful cotton crops. Cotton cannot be raised near Bombay; and if at

* A sample parcel is sent along with this by same post.

Broach the fall of rain was any thing like that at Bombay, it is clear no cotton bushes could grow; they would be rotted by the excess of moisture, as they have been in all low places during the past two seasons. These latter remarks apply chiefly to G. h. and G. a., for each variety of cotton plant varies much in habit. Crossing appears to me to be a very likely mode of obtaining a better and more productive kind of plant than is at present cultivated in India. Witness the varieties of the potato thus acquired; of the Hopetoun oat, now so universally esteemed in the Lothians. Use the pollen of some of the fine foreign cottons to impregnate the blossoms of the hardy, and suited to climate, (G. a.,) and is it too much to expect to permanently improve upon it? In the case now under notice, I am perfectly satisfied of the success so far; but will the produce from the seed of any plant retain the improvement? We must try and see the results next season. If an acre of land were planted with 7,000 plants—not too many—and they yielded at the rate above stated, or take it only at grains, 720 each plant, then the wool would amount to 201 lbs.; and at 4*d.* per lb., or 6 lbs. per rupee, its value would be 34 rupees, a sum one-third of which would be ample to cover the expenses of cultivation, if judiciously gone about.

"The number of seeds from 855 grains of produce was—

Cross-plant	- 676 good.	G. a.	762 good.	Difference in number, 62.
	27 bad.		3 bad.	
	703		765	

"A. BURN.

"Broach, *January* 25, 1845.

"P. S.—It is clear the cause of the partial success attending the experiments in cultivation of the American cotton plant, both at Coimbatore and Dahwar, depends on the moisture of both monsoons affecting the atmosphere of those two places, on different sides of the Gats, with a degree of moisture, the continuance of which is sufficient to admit of the growth and maturation of the produce. The pass in the Gats at P. admits of this.

"A. B."

I sent Colonel Sykes a specimen of a hybrid cotton plant, raised here. I am full of hope that something good may be obtained by crossing the foreign with our native cottons. What think you?

Dr. Burn, commenting on this result, says: "Crossing appears to me to be a very likely mode of obtaining a better and more productive kind of plant than is at present cultivated in India. In the case now under notice, I am perfectly satisfied of the success so far; but will the produce from the seed of any plant retain the improvement?" I must conclude with asking, what do you, and what do your correspondents say to the course of experiment, and to its probable results?

J. F. R.

GROWTH OF COTTON IN INDIA.

Three years ago I addressed the subjoined letter to a gentleman in Liverpool, connected with the trade to South America, and he forwarded a

copy of it to his partners in Peru, who did me the honor to translate it into Spanish, and circulate it among the planters there; but with what effect, I know not. Now, it seems to me to be quite as applicable to India as Peru; and it every year becomes more evident how vitally important it is for us to endeavor to grow that indispensable article, cotton, in our own colonies, rather than continue dependant on the United States for our supplies; as a war of two years' duration, or even a serious outbreak among the negroes, (which is very likely to occur if we have a war with the States,) might set fast all our mills, and deprive our work-people of bread.

I am aware that many experiments, having for their object the growth of a better quality of cotton, have failed; indeed, so long ago as the year 1828, I sent seed of many varieties to Calcutta, where they were put into the hands of the Horticultural Society; but I heard no more of them, and it did not then occur to me that the failure of all attempts to grow good cotton would be probable, from the overwhelming preponderance of the native cotton, planted in the same vicinity. The growing of better kinds of cotton may have been attempted in India, with the precautions suggested to the Peruvians; but if it has, I have never heard of it; and I am convinced if success is to be obtained at all, it must be sought for in that direction.

T. G.

The following is the letter above alluded to:

"I have for some time intended to call your attention to the importance of attempting to grow fine cotton in Peru. We have been, as you are aware, consumers of Peruvian cotton to some extent for the last six or eight months, and, from the observations I have made on it during that time, I have no hesitation in saying that it possesses many excellencies. It is long enough, (almost too long,) very sound in staple, and, when well managed, of a very good color; its defects are coarseness and harshness of staple; and if these could be removed, I do not see what is to prevent its rivalling the Egyptian and Sea island cottons, any considerable approximation to which would very materially enhance its value; seeing that the highest quotation for Sea islands was last week 30*d.*, whilst the highest for Peruvian was no more than 6½*d.* With the view of improving the quality of cotton in Peru, I would strongly recommend you to send seeds of various kinds, packed in air-tight boxes, particularly Sea island and Egyptian, which some of the cotton brokers would easily procure from the spinners using these descriptions; and, judging from what I hear of the climate of both countries, I should think the Egyptian would go to a very similar atmosphere and mode of cultivation to that where it has been raised, which would be very likely to render it much more easily acclimated, and of course make it much more likely to succeed than a sort of cotton which had been grown under dissimilar circumstances of soil, climate, and mode of cultivation.

"These seeds, when sown, ought (with the exceptions hereafter to be mentioned) to be planted at such a distance from all other cottons as to render it very unlikely for the wind or insects to carry the pollen from the flowers of one kind to those of another; for, without this precaution, such is the tendency in many genera of plants to hybridize or cross breed with each other, (and I believe, from what I have heard, that there is this tendency in the different varieties of cotton,) that, however good the quality in the first instance, they would all revert to the old variety in a season or two, in consequence of the great preponderance of that variety over any

newly introduced ones. So much are the growers of turnip seed, for sale in England, aware of the importance of attending to this, that the greatest precautions are taken to remove all cruciform plants from the vicinity of the field, whilst their turnips are in flower, as there is such a tendency in them all to hybridize that the quality of the seed is often injured by the wild mustard (*sinapis arvensis*) springing up in the same or adjoining fields; whilst by carefully selecting, on the other hand, the best bulbs for seed, and by judiciously crossing one variety with another, new sorts are obtained, combining the excellencies of both. This leads me to observe, that probably seed of foreign varieties of cotton may not thrive well in the first instance; and I would therefore very strongly recommend the gentleman who makes the experiment carefully to select seed from the plants on his estate which he sees are producing the best and finest cotton, and sow them in contact with a few seeds of each of the sorts you may send out to him, carefully removing them in every instance, as far as is practicable, from the vicinity of all other cotton; and then again sowing the seed which is obtained from these experiments, and carefully examining the cotton growing upon each of them. It is more than probable that some of the plants will be varieties partaking of the character of both the parent kinds; and by selecting the best of these, and sowing them alone, (still at a distance from all other cotton,) there is but little doubt that much benefit will be derived by the persevering and skilful cultivator. I have heard it stated that the origin of the Sea island cotton is to be traced to something of the kind. An observing and experimental planter, by carefully examining his plants, and sowing seed always from those alone which produced the largest and finest cotton, at last arrived at that excellent quality known by that name. Look again at what has been done in Egypt, by the introduction of seeds of better cotton; and there this improved variety has by no means had a fair chance of showing what it is capable of becoming, inasmuch as the wretched cultivator has not the slightest inducement to improve its quality. He gets no more per pound for the finest and cleanest cotton than he does for the coarsest and dirtiest, and therefore it is not very likely to improve under his care. But with all this neglect and want of management, we can see, by what it is, what it would most probably become in the hands of an enterprising and skilful man, who knew that every improvement he made in its quality would be to his own advantage. Assuming that our Peruvian friends would so far improve the quality of their cottons as to double its value in this market, (and I do not think myself too sanguine in expecting even more than this,) with very little extra labor, nearly all the additional price would be profit.

"But supposing that even cross-fertilizing, or hybridizing, as the horticulturists call it, does not frequently naturally occur in cotton plants, we all know that it is very easy to effect it artificially, by prematurely unfolding the petals, and with fine scissors cutting away all the stamens before impregnation takes place. This requires to be carefully done, so as not to injure the petals, and they will then close again of themselves; and when they expand naturally, then impregnate the stigma of the flower with the pollen of the kind you want to cross with. We owe many of our finest varieties of fruits to this practice. The late Mr. Andrew Knight, in particular, was very successful in raising new kinds in this way. And it appears to me, from the experiment I have made, that the more frequently this cross breeding takes place, the more easy (within certain limits) it is

to extend it, until cultivation has so completely changed the character of the plant that it bears very little resemblance to its original stock. There is nothing growing wild like our cabbages, turnips, and cauliflowers, nor even like our carrots, celery, and asparagus. Where are the originals of our wheat, barley, rye, beans, and peas? Many of these appear to be so completely transformed by cultivation, that we do not know where to look for the original stocks from which they have sprung.

"THOMAS GARNETT."

From the Southwestern Farmer.

MR. HAMMOND'S REPORT.

We give, at the conclusion of this notice, the report of a committee of which our friend, J. H. Hammond, was chairman. We congratulate him on the knowledge of farming that he displays. We see how readily the educated and intelligent can learn the business of farming. But a short time since, our old school-mate was up to his eyes in politics: he now retires to the field, there to live a quiet, peaceable life. We rejoice at it, and can but repeat the remark we made to him before he was elected governor: "You are wrong—you have no business in that sphere—seek your ease and peace —it suits you better, and will give you satisfaction." His answer was then, as his works answer now: "I will do so as early as the force of circumstances will permit;" or to this purport were both.

We again congratulate him, and also our country, in the success of our friend. We also press on all agriculturists any articles from the pen of Hammond; he will, we feel assured, give all matters that he writes on his minute and particular attention. We have known him from both of our boyhoods, and know him to be talented and observing; and, more than all, when he does apply himself, it is an application deserving and insuring success.

As we are his senior in planting the cotton, especially in personal attention to it, we beg to give him a hint or two. We may err in our notions; and why we say so, is, that we differ so materially from so large a number of farmers. We think that very early planting is disadvantageous. And to define early planting: We think the last week in March is early enough at any time, even for this year, when it will be borne in mind the fruit trees were quite green at that time; to plant as early as the 15th or 20th of March is "very early." We generally judge it to be time to plant corn when the "leaf of the oak is as large as the squirrel's ear;" many of our planters have planted cotton as early. We think cotton planted from the 1st to the 10th of April is early enough for old land, and have known, by several crops, that the later planting—say the 10th—was considerably better than the early; we know this not only by our own weights and measures, but also by others.

We would make an exception to early planting. New ground and rich fresh land has such a tendency to make weed, that it is necessary to plant as early as a stand can be had—so all think; we would not object, but think that judicious culture would make a different result. We would act precisely as with the tree that produced wood instead of fruit—amputate the roots. We think that if the land has been broken up very early, and

left to be consolidated by rains, then planted about the 5th to the 10th of April, thinned out as early as it was up, cultivated deep and late, the stalks would set the fruit and ripen in time. Do we not thus with fruit trees, Irish potato, and sweet potato—the latter, too, by either cutting off tops, or feeding with calves? And why not a similar practice with the cotton plant?

The cotton plant is a very tender plant if treated as it was some ten or fifteen years since—some three to six bushels of seed sown per acre, and it not thinned out until third leaf had appeared. It has been raised in a hot-bed, and no wonder it be tender; but if sown thinly, and then thinned out to single stalks, we think it a hardy plant. There is no use in trying the hardihood of the plant—it is unlike corn. It has a tap root, grows in dry weather, and unless the land has not been properly prepared, or remarkably dry, it will improve by hot or dry weather; but corn having superficial roots, should be planted early as possible, that it may ripen before the drought sets in. If cotton will make 1,000 pounds per acre when planted late in May, there can be no fears to plant 10th April. The farmer can place his land in excellent order—have his corn cleaned handsomely; and when cotton is up, he can push it to the utmost. We request our friend H. to plant one acre of cotton, even now, after his seeing this, on a piece of well ploughed land, in the same field that he has now even scraped over. Just open out furrows where the cotton now stands, which will destroy the cotton that has been scraped. Our impression is, that the difference will be very slight, and, if adopted generally, would give considerable time to manure, plough, and improve, instead of giving cotton the additional working necessary. The land that we have known planted late would not, average seasons, make any thing like one-third more by early planting; and if the extra labor was applied to improving it, we doubt if it would yield as much. Understand, we do not advocate either late or early planting—that is, after the 25th of April or before the 1st; and only wish to show there is not so vast difference between planting 1st April and 1st May. What would be the gain to any farm by this extra month's work? P.

—

REPORT OF THE COMMITTEE OF THE BARNWELL AGRICULTURAL SOCIETY ON THE CULTURE OF COTTON.

The ground cannot be too well prepared for cotton.—If it has rested one year it should be broken flush, as early in the previous fall as possible, and headed just before planting. If it has rested two years or been planted the preceding year, let it be listed as early as it can be done, and two furrows thrown upon the list. Immediately upon planting, let two more furrows be thrown up, and the balk broken out completely. The common method of running three furrows, and planting on it, throws the winter's portion of the crop work upon the laborer during crop time, and is inexcusable, unless heavy clearings are absolutely required. The reason for not listing after one year's rest is, that the vegetation matter will be too abundant, and too coarse to form a substratum to receive the tap-root.

Cotton should be planted early.—It may increase the difficulty of getting a stand, and give the plant, for a long time, a puny appearance, but every stalk of cotton planted in March, or first week in April, that survives, may

be readily distinguished in any field that has been replanted later. It bears more, and earlier, and stands all the vicissitudes of June, July, and August better. There are several methods of planting. Your committee recommend planting in spots regularly measured by the dibble. It is somewhat tedious, though less so than is generally supposed, and certainly does not take as much time as both to drill and chop out; nor is time so valuable at that period as when the latter operation is required, while a better and more regular stand may be secured. There is no land, or but little, in our district, in which cotton rows should be over three feet apart, or the cotton further than fourteen inches in the drill, one plant in a place. To make a large crop there must be an abundant supply of stalks. When the weather is too wet to plant, time may be often saved by dropping the seed, but not covering until the ground is drier. If, however, it cannot be covered in three or four days, it is time lost, for it must be replanted. Always cover lightly, under any circumstances; and always plant on something of a bed, in any land. It keeps cotton drier, and affords more air when it is young; it enables you to get at it in working. By increasing the surface, it absorbs more moisture if it is too dry, and gives out more if it is too wet; and, in both cases, gives you the advantage of a vertical sun on the tap-root, which hastens the maturity of the bolls—a vast desideratum in our climate. On this account the bed can hardly be drawn too high at the list hoeing in any season.

In cultivating cotton, whether with the plough or hoe, the chief object is to keep down the grass, which is its greatest antagonist, bringing all, or almost all other evils in its train. It is not so essential, in the opinion of your committee, to keep the ground stirred, as is generally supposed, and by no means requisite to stir it deep—at all events not to our light soil. If it be well prepared, deep ploughing is not only unnecessary for any of our crops, but often highly injurious to them, while it rapidly exhausts the land by turning it up fresh under a burning sun. Much unnecessary pains is usually taken and time lost to work the plant in a particular way, under the supposition that it is a peculiarly delicate one. If it survives its infancy, few plants are hardier. It is often found to reach maturity in the alleys, where the mules walk with the ploughs following, and the laborer tramps backwards and forwards. Sometimes it will bear fruit in turnrows used frequently for wagons, while it really seems to derive benefit from being bitten down almost to the ground by the animals; it will bear almost any usage better than it will that mortal enemy, grass.

The most critical operation in working cotton is *thinning*. It should be done with great care, and, if early, with the hand. In a dry year, it cannot be done too early after the plant is up. In a wet one, it may be profitably delayed until it has begun to form, or later even. On the experience, observation, and judgment of the planter, in this matter, every thing depends, as each year brings its own rules with it. Where circumstances are favorable, early thinning is of course the best. Some planters always top their cotton; others never do. Your committee are of opinion that it seldom or never does harm to do so; but whether it is worth the trouble is a doubtful question. Those who have no clearing, or other important employ for their hands, would lose nothing by devoting three or four days to this operation early in August. Those pressed for time might gain by omitting it.

Too much pains cannot be taken in preparing cotton for market, for they

are all well remunerated by the additional price. The first thing to be attended to is to have it gathered free of trash. With a little care, wonders can be effected in this way, and hands with a short training will pick almost if not quite as much without trash as with it. It should never be gathered when wet. And here it may not be out of place to remark, that one of the very best sanitary rules of a plantation is, never before frost to send out your hands to pick until the dew has nearly or quite disappeared. It saves time in the long run, as well as health and life. Cotton should never be ginned until the seed are so dry as to crack between the teeth. If damp, it is preferable to dry it in the shade, as the sun extracts the oil and injures the staple. If by accident, however, it gets wet, there is no alternative but to put it on the scaffold. It is of great importance to sort the cotton carefully into several qualities, in ginning and packing; for by mixing all qualities together, the average of the price is certainly lowered. A few old hands, or very young ones, breeding women, sucklers, and invalids, will earn excellent wages in a gin-house at this occupation. Neat packing is of no small importance in the sale of cotton, and no little taste may be displayed in making the packages. The advantage of square bags is universally known, and the committee are astonished that any other should ever be made now.

Every kind of manure is valuable for cotton.—Every kind of compost, green crops turned in, cotton-seed, and even naked leaves, listed and left to rot, improve this crop. When planted on cotton-seed, and sometimes on strong stable manure, it is more difficult to retain a stand, owing probably to the over-stimulus of these strong manures. So on leaves, unless well rotted, the cotton will long continue to die, in consequence of the leaves decaying away and exposing the root too much to sun and rain. These difficulties may be avoided by a little pains, and by no means justify the opinion entertained by some, that cotton should never be planted on freshly manured land. The only question is, the cost of the manure. A great deal may be made on every plantation, without much trouble or expense, by keeping the stables and stable-yard, hog and cow pens, well supplied with leaves and straw, and also from pens of corn cobs, sweepings from negro and fowl-house yards, and rank weeds that spring up about them, collected together and left to rot. Whenever the business is carried further, and a regular force is detached to make manure, at all seasons, and entirely left out from the crop, it becomes the owner to enter into a close calculation of the cost and profits. In many agricultural operations, such a course the experience of all countries has proved to be profitable, but these operations partake rather more of the farming and gardening than planting character, and whether the same method will do for the extensive planting of short staple cotton, remains, in the opinion of your committee, yet to be tested. If any thing like an average of past prices can be maintained, it is certain that more can be made by planting largely than by making manure as a crop. If, however, prices continue to fall, and the growing of cotton be confined to a few rich spots—those susceptible of high manuring—then our whole system must be changed, our crops must be curtailed, and staple—labor losing its past value—the comparative profit of a cotton and manure crop, will preponderate in favor of the latter. As a substitute for manuring on a large scale, resting and rotation of crops is resorted to. In our right level land, the practice of resting cannot be too highly recommended, and, by a judicious course—such as resting two and planting two, or at most three

years—our lands may not only be kept up forever, but absolutely improved. From rotation of crops but little is gained for cotton. After small grain, whether from the exhausting nature of that crop on light lands, or because the stubble keeps the ground always rough and porous, cotton will not do well. After corn it is difficult to tend, as, from our usual manner of cultivating corn, grass is always left in full possession of the field. It does best after cotton, or after a year's rest. Rest is the grand restorer, and the rotation chiefly required in the cultivation of cotton.

J. H. HAMMOND, *Chairman*.

From the Nashville Agriculturist.

PREPARING FINE COTTONS FOR MARKET.

EUFAULA, BARBOUR COUNTY, ALABAMA,
April 25, 1845.

GENTLEMEN: Yours of the 14th instant was received by last night's mail, calling on me for my system of preparing for market fine cottons. As it at all times affords me the greatest pleasure to do or say any thing that may in any way be of any service to my brother farmers, I lose no time in replying to your inquiries.

But to the point. I live in latitude about 31½. The land I cultivate is poor pine land, which would not sell at the present time for five dollars per acre, (though I am at this time making a great effort to enrich it by manuring) We cultivate our cotton on the usual plan adopted in this section of country, taking care to keep it clean, and not suffering it to be injured by grass or weeds—ploughing it late with the sweep or buzzard plough; so that when we commence picking in the fall, there is not a particle of grass or weeds. We commence picking out as soon as the cotton opens; and here is one of the great secrets of making fine cottons. Last year we commenced on the 7th of August, and picked out in that month nearly one-third of our crop, as we made but about one hundred thousand pounds of seed cotton. I find at page 132 of my Farming Memorandum, for 1844, the following entry, to wit:

Picked out in	August	21,000	pounds.
Do.	September	36,000	"
Do.	October	38,000	"
		95,000	

So you discover that our crop was nearly out by the first of November. We take all the care we possibly can in picking it out of the field, not suffering our pickers to pick any; or, at any rate, we avoid trash as much as possible, as we average only about 100 pounds per day; and it is not uncommon in this country to nearly double that amount in picking. It is then dried on a scaffold. We always require our hands to pick it over as the baskets are emptied on the scaffold. It is only the hands that are not employed in weighing that are engaged in picking it over. After it is dried we pack it away closely, and suffer it to remain in bulk some three months, for the purpose of drawing oil from the seed, which gives the cot-

ton that beautiful cream color, or golden tinge, so much admired, and adds to its value some two cents in the pound, provided it is not heated too much; for it may be completely ruined by over-heating. We gin with a fine saw gin. When we start our gin we set some five hands to picking over the cotton before the gin, to pick out the remaining trash that may be left in the cotton, and the yellow ends of bolls, that greatly injure the cotton if suffered to remain and be ginned up with it. We run our cotton through a flue after it leaves the brush. This flue is about eight feet long, and is so constructed that all the dirt and fine trash, in passing over the fingers or ribs of the flue, falls in a box below, and is emptied out once a day. We run our gin extremely slow—so much so that the cotton is not passed from the brush sufficiently hard to throw it out of the flue: consequently, a hand pulls it out of the mouth of the flue. One hand drives the mules, though a boy will answer for that purpose; then the ginner and the five hands picking over, and the hand that pulls it out of the flue, and a boy that hands the cotton to the ginner—making in all eight hands, though most of them are small hands. We do not suffer much cotton to remain in our room that holds the picked cotton, but pack often. We take the greatest care, in packing, not to suffer the cotton to be trod in the box, but run the screw down on it twice or three times, as every time the cotton is trod on it defaces it to some extent. We are very particular to put up our cotton in nice packages, with the best bagging and rope, carefully sewing up the sides and ends. We make three distinct qualities of cotton, as every farmer, I think, should do. We place our name and residence on the first and second quality; on the third quality we put the letter *M.* The past year we made 59 bales, in the following order: 31 marked A. McDonald, Eufaula, Ala., (with 3 F.;) 16 bales, A. McDonald, Eufaula, Ala., (2 F.;) 12 bales marked *M.* The *M* cotton we sold at Appalachicola at 4½ cents; most of the 2 F. we have sold in New York at 7 cents; the 3 F. we have refused 9 cents for, and expect to get 10 cents. It took us something over three months to pick out our cotton out of the field, and about two months to gin it, with nearly as many hands as it took to pick it out, as we gin but little over a bag a day. Thus, Messrs. Editors, you discover that it is a tedious business to make fine cotton; but I think I am amply paid for my pains, not only in money, but what I esteem more—my standing as a farmer.

Your friend and obedient servant,

ALEXANDER McDONALD.

Messrs. Cameron & Fall.

P. S.—Messrs. Editors, I have endeavored to be particular in answering your inquiries as to the plan of making fine cottons. We made last year near five bales to the hand, weighing 490 pounds; but ours is completely the cotton-growing region. This important plant loves a southern sun. If I lived in Tennessee, I would, by taking the same pains with the products that were intended by the Almighty to be reared in that more northern latitude, if I am not greatly deceived, be as successful as I have been with cotton. Agriculture is a great business; it has to be studied as a science. We, as farmers, must procure all the lights that we can, to succeed in our honorable avocation. A. McD.

N. B.—We cultivate, as we have stated, poor pine land. We made last year about 1,000 pounds of cotton to the acre. By a system of manuring

that I have now commenced, I have no fears but that I can double that quantity, and make 50 bushels of corn to the acre. We made, last year, 6,000 bushels of manure: we expect to more than double it this year.

A. McD.

From Wilmer and Smith's European Times, January 4, 1846.

LIVERPOOL ANNUAL COTTON REPORT.

The review of the year 1845 is simple. The fluctuations in fair qualities of upland and Orleans cotton, from the highest to the lowest, have exceeded 12 per cent., and the import, generally, has been profitable. The season opened under favorable auspices. The stock on hand was large, but prices were so low as to inspire confidence. All expectation of an overwhelming import, which had operated so prejudicially in the month of November, and in the beginning of December, 1844, had disappeared before the month of January of the present year, and the result now proves the American crop to have been 2,394,500 bales, exclusive of 25,900 bales from Texas. It is true that there are many, who, in January last, believed this to be an over-calculation, and, under the conviction that the growth would not exceed 2,100,000 to 2,200,000 bales, prices rather advanced in that and the following month. In addition to this motive for action, common both to the speculators and the trade, the announcement of the intended repeal of the duty on cotton furnished fresh stimulus, and the sales were very extensive. But, in spite of this, the month of March, by a combination of circumstances, proved to be unsatisfactory, since, instead of advancing, the market declined $\frac{3}{8}d.$ per lb. The duty of $\frac{5}{16}d.$ per lb. on cotton wool, however, being then taken off, the real difference in money to holders was not important; but as many of them, in the first instance, expected to gain that amount, the disappointment seemed almost equivalent to a loss. In the early part of April, the statements as to crop, which had, as just stated, been gradually diminishing, now began again to increase, and the receipts into the ports seemed to justify the new anticipations. It was for a time in vain that the buying here continued large, and that the probability of dissension between the United States and this country respecting the Oregon territory was again brought more prominently forward by the declaration of both parties in the House of Commons as to the general determination of the legislature not to surrender our early rights to the disputed country. All was unavailing, under the pressure of the heavy stock and increasing supply, to raise prices. On the contrary, they again receded. This state of things, it is true, was only of short duration, for the profits realized by spinners being at least 2$d.$ to 3$d.$ per lb. at the end of April, and in the beginning of May, the decline was again recovered, and the excitement upon the American question seemed to gain fresh force. It is certain that neither then nor any time since has it been generally believed that the discussion would terminate seriously; yet a certain degree of fear has existed, that, previously to any final arrangement, so angry a feeling might be raised as to interpose increased difficulties. The negotiations were now rendered more delicate and critical from the decided manner in which each party had asserted its claim, and with every wish to avoid actual hostilities; yet, in discussions between nations, the slightest untoward incident may lead to open rupture. It is this same sentiment which still prevails, and

which has always more or less entered into the views of holders, throughout the year. The message of the President is of a nature to confirm this impression. Returning, however, to the question more immediately before us, June was a month of large business, though without any advance in price. The only new feature which manifested itself, was that of advices as to the appearances of the coming crop of 1845–'46, which were not propitious. Though the period of the year was far too early to form any correct judgment, yet the plant germinated, it was said, so unfavorably as, in the opinion of many, to furnish a reasonable motive for steadiness in prices. In July, the intelligence continued to be of the same description; and it was then also supposed that the crop would be later than usual. Speculators, encouraged by the facilities of the money-market, as well as by the continued prosperous state of trade, and the lowness of prices, purchased largely on the one hand, whilst the spinners, on the other, deemed it prudent to keep up their stocks to a point beyond their usual quantity. It was the large supply in the port alone which tended to keep the market in check. The weather might have had some little effect at that period; but this was only slightly regarded, though circumstances have since proved of what immense importance was its then character. Before the end of August, all apprehensions as to the harvest, if any were ever seriously entertained, seemed for a time to subside, and the market again improved. The stock of American cotton had reached its *maximum* of 832,000 bales. This amount now began sensibly to diminish, and the month of September was one in which the business transacted was of vast extent. In the beginning of October, in consequence of the alleged deficiency of yield in the wheat crop, and of the injury done to the potato crop in this and other countries, a settled, dull, and anxious feeling began to prevail; and this continued unabated throughout the remainder of the month. November was still more discouraging, and a second advance in the rate of interest to $3\frac{1}{2}$ per cent., by the Bank of England, (the rate of interest had already been raised, on the 16th of October, from $2\frac{1}{2}$ to 3 per cent.,) effectually destroyed all hope of change for the better in the money-market; and with this all prospect of amendment in cotton seemed for the moment to be annihilated. During the present month of December, there has been a regular and steady demand daily; but a tighter state of the money-market, coming, too, at a period of the year when there is always rather a desire, than otherwise, to liquidate existing engagements, and to diminish the amount of responsibility, both on the part of merchants and brokers, had, until counteracted by the advices of the last packet, bringing reduced estimates of crop, operated still further to depress prices, and to throw a gloom over commercial transactions generally. The projected change in the ministry, and the uncertainty of the immediate effect of the measures to be proposed with reference to the opening of the ports for the admission of grain, and the abolition of the corn-laws, have contributed still more to unsettle the public mind, and in the doubt that has been raised, and the hopes and fears which have alternately predominated, trade has suffered, and confidence has been considerably shaken. The railway deposite question, also, which belongs to another part of our subject, has likewise been one of the principal causes of the distrust which has pervaded the moneyed interest, and through this influence essential injury has been done to the holders of cotton.

Having now alluded more especially to the fluctuations in the article itself, other events of the year, as they are more or less indirectly connected

with it, call for a few observations. The first one of these in the order of time, and probably in importance, as it refers to cotton itself, is the abrogation of the whole import duty, which is one of the most remarkable events in the history of commercial policy. It is a measure fraught with wisdom, not only as being in itself of vital importance to the country, but as a precedent for other changes of a like nature. It will tend to give a still greater development to the manufacturing energies of Great Britain, and will better enable us to compete, in common and heavy fabrics, with that very country (the United States) where the raw material itself is produced. It had been a growing complaint, that the duty, which constitutes in coarse goods so heavy a per centage upon the cost, was causing our manufactures to be superseded in the South American markets; and it was to correct the evil in that hemisphere, and to prevent its extension to India, upon which so much of our future prosperity depended, that, seeing the financial state of the country would bear the abstraction, the government wisely abandoned this branch of revenue, though it is certain that, for immediate popularity, other reductions might have been selected, and other taxes taken off, which would have been more acceptable to the multitude. This act of the government cannot be too much commended.

The next point which calls for comment, is the mania in railway speculation during the greater part of the year. The words of the historian of 1720 describe in so accurate a spirit the folly of 1845, that it can hardly be out of place to quote them. Speaking of the South sea and other schemes of that day, he says: "All distinctions of party, religion, sex, character, and circumstances, were swallowed up in this universal concern, or in some such pecuniary project. Exchange alley was filled with a strange concourse of statesmen and clergymen, churchmen and dissenters, whigs and tories, physicians and lawyers, tradesmen, and even with multitudes of women. All other professions and employments were utterly neglected, and the people's attention wholly engrossed by this and other chimerical schemes, which were known by the denomination of bubbles. The sums proposed to be raised by different expedients amounted to £300,000,000 sterling, which exceeded the value of all the land of England. The nation was so intoxicated with the spirit of adventure, that people became a prey to the grossest delusion." By a most valuable synopsis, published in the London Times newspaper last month, it will be seen that 47 completed railway companies had paid up and borrowed £70,000,000; that 118 lines in the course of construction, and for which acts of Parliament had been obtained, required £67,000,000; that for the railways projected, amounting to 1,263 companies, £59,000,000 of deposites would be necessary; so that the total capital invested and required, (taking the amount actually paid up at £54,000,000 in railways completed, and those in course of execution, sanctioned already by Parliament, into account, together with £59,000,000 to be paid of deposites upon new lines,) would be £113,000,000. Thus, to carry out these projects, including the money already borrowed, £590,000,000 would be necessary—the very magnitude of which sum must strike every one as evidencing the highest degree of insanity in any nation which could entertain projects involving such an outlay. The deposite question, as it has been generally designated, arose out of this extraordinary state of things. By the act 1st and 2d Victoria, it is rendered imperative that the deposites upon the undertakings in question should be paid into the Bank of England, to the credit of the Accountant General,

within 14 days after the meeting of Parliament. It is true that the check so opportunely given by the Bank of England, by raising the rate of interest, effectually put an end to many of the schemes; but it was supposed, in the first instance, that a sufficient number had complied with the forms necessary to make the deposite alone £20,000,000. Subsequent information has led to the conviction that this sum was greatly overstated, and that the amount required will not be £10,000,000; but during the time that the process has been going on of weeding out the lines which had not complied with the necessary formalities, great uneasiness has existed in the money-market. The banking interest all along has felt quite unable to explain how the difficulty would be met; and, although certain that, from the total impossibility of complying with the law, there must be some mode of extricating the country from its embarrassment, yet, even now that £10,000,000 only are supposed to be required, the moneyed interest is necessarily upon its guard; for to withdraw this sum, if only for a few days, from the requirements of trade, would be to put a stop to the whole machinery of the circulation, and derange all branches of public financial arrangements.

The President's message, though looked for with great anxiety, has produced less effect than might have been expected. Its tendency by a few is not thought to be unpacific; but the generality of persons consider, notwithstanding its calmness of tone, that there is a determination pervading it which is any thing but amicable in spirit, or generous in feeling. It seems to breathe a decision of purpose hardly concealed by the moderation of its language. Its demands assume conclusions which are most exaggerated; and its harshest and worst feature is, that it seems to close the door, by anticipation, to all interference in a matter which, in case quarrel is to be avoided, can best be arranged by foreign friendly arbitration. It is difficult to suppose that nations so wise and so enlightened as our own and that of the United States should not recoil from the idea of war for the sake of so trifling an object as the possession of a wilderness, separated from both countries by rocks and deserts on the one hand, and by the ocean on the other; but as there is a point beyond which concession would be considered weakness, it is impossible to say what may be the result.

The deductions to be drawn from all the facts before us are, as usual, liable to much uncertainty; and the crop, after all, in the opinion of most persons, is the main point upon which, as far as cotton is concerned, the future depends. There are some who rate this high, and consider that it will reach 2,300,000 to 2,400,000 bales; but there are others, equally well informed, who pretend that 2,200,000 bales will be the *maximum*. Added to this contingency, there is the certainty of a large consumption and a good trade, and the remote possibility of war; but the transactions of this year, as far as regards speculators, have been so unfortunate that it is probable the market will be left very much to the trade for some time to come, and under these circumstances it is rare for prices to improve either very rapidly or considerably. Decline seems considered by every one to be out of the question; but whether or not any material advance is to be experienced, depends so much upon points that are yet doubtful, that to predict an important rise, should it prove to be the case, would be rather a fortunate conjecture than the result of reasoning which at present could be fully justified.

HAYWOOD & M'VICCAR.

DECEMBER 31, 1845.

From Wilmer and Smith's European Times, January 4, 1846.

MANCHESTER MARKET—ANNUAL REPORT.

In addressing you with our two last annual circulars, we had occasion to notice the general fulfilment of the expectation we had held out at the commencement of each period embraced by them, of a satisfactory course of business. Seldom, however, have our prospects appeared of a more propitious character than those which ushered in the past year, 1845. The demand for our manufactures abroad and at home was gradually and steadily increasing, employment of the working population was very abundant, food of all descriptions was plentiful and cheap, capital was accumulating and seeking every channel for employment which offered any fair chance of being a profitable investment; and as our foreign political relations were without the appearance of any immediate interruption, confidence was general throughout the commercial world. With a combination of such favorable circumstances, and with an abundant supply of the raw material, which forms the basis of the staple manufactures of this district, and of which, independently of the large stock in Liverpool, so considerable a portion was also held by spinners and manufacturers, as to prevent the probability of success being gained by any extensive speculation in the Liverpool cotton market—should such be attempted, it was not difficult to conclude that the course of our market would be favorable for some time forward.

For the first two months of 1845 we had a continuance of the favorable aspect which characterized our market at the close of the previous year, and prices gradually, but decidedly, advanced for most of our staples. The months of March and April witnessed a less active state of business—the market being influenced by the long continuance of the frost, (which retarded for a time the usual continental demand,) by unsatisfactory advices from the Bombay and Calcutta markets, and also by an uneasiness which began to be entertained for the settlement with the United States of our claim upon the "Oregon" territory. The effect of these circumstances was a decline in prices generally, and which reached to a greater extent before the end of April than was previously expected. The month of May, however, showed a renewal of the demand, and prices were extremely steady, with a slight tendency upward, which became more decided in the succeeding months of June and July, when a considerable advance took place. In the early part of August, fears began to be entertained as to the result of the harvest, the weather being generally unsettled throughout the country. The month of September was one of critical importance to the maintenance of the prosperity which may be said to have characterized every previous month of the year; the early part of it gave promise of those expectations being realized which were formed upon the improvement of the weather towards the close of the previous month; but these were soon succeeded by renewed fears in consequence of a return of the unpropitious weather, which continued until it became evident that the harvest could not be secured in good condition, and that the yield would be deficient in both quantity and quality. In October a new ground of alarm began to present itself in the unexpected and serious failure in the potato crop, and which not only existed in this country, but extended itself throughout the continent of Europe, besides occurring again in the United States. It was in this month, also, that the Bank of England deemed it necessary to

raise their rate of discounts, for the first time during the past year; and this, accompanied as it was by increased rates of discounts throughout the country, brought on a tightness of money generally, (and especially in the share market,) and led to a sudden and rapid decline in the prices of all shares—many of which became almost totally unsaleable. The effect of this reaction was not confined to scrip shares, but extended also in a smaller but still serious degree to shares in the long-established and dividend paying lines, which declined sympathetically, and often with less discrimination to their respective merits than to the strength or weakness of their holders. The combination of these untoward circumstances could not exist without producing considerable influence upon the state of our own market; and during the month of October a general languidness existed, which was followed, in November, by a sudden and most serious decline in the value of every description of goods and yarns. The difficulties which combined in producing this decline were no doubt much increased by the uncertainty then and still existing as to the manner in which the railway deposites are to be paid over to the Accountant General on the opening of Parliament, and which rendered the bankers unusually tight with their customers; and were also further enhanced by unsatisfactory advices from the United States respecting the "Oregon" question. Towards the end of October, and in the month of November, a general impression existed that government would open the ports, by an order in council, for the admission of foreign grain and provisions, with the view of averting the evils attendant upon the impending scarcity; but as a succession of cabinet councils were held, and broke up without any such determination having been come to, the general gloom and want of confidence was continued and augmented towards the close of the month, and was evidenced in this market by sales being pressed at most sacrificing rates. The same features have since continued with more or less intensity during the month of December, attaining their maximum towards the middle of the month, and during the continuance of the ministerial crisis which succeeded the resignation of Sir Robert Peel and his cabinet. Since his resumption of office, more confidence has been felt throughout the country; and our market, although without any decided improvement in prices, may be considered rather steadier and firmer; for it is felt that he has the power to carry through Parliament such measures as the country in its present critical position requires.

Similar to the course of our own market has been, with little exception, that of the Liverpool cotton market. Throughout the early part of the year, and up to the month of September, spinners and manufacturers purchased freely, although a gradual advance was taking place in prices during that period, and which, notwithstanding the remission of the import duty on the 22d of March, of $\frac{5}{16}$ths of a penny per pound, amounted, by September, to fully $\frac{3}{4}$ths to 1*d.* per pound, average. Upon reference to the Liverpool brokers' circular, we find the trade had taken, up to the 26th of September, 1,151,210 bales, or at the rate of 30,295 bales per week—an excess over the power of consumption, according to the best estimate we can form for the year 1845, of fully 3,000 bales per week. At this period the same unfavorable circumstances, of which we have more minutely traced the operation on our own market, began to have their influence on the state of the cotton market also; and we find, from the same authority, that the quantity of cotton taken by the trade during the remainder of the year, up to the 26th December, amounted to only 245,010 bales, or an average of 18,847 bales

per week; thus making the total quantity taken, from January 1st up to that date, 1,396,220 bales, or a weekly average, for 51 weeks, of 27,377 bales. Notwithstanding the recently diminished supplies taken by the trade as above noticed, we are of opinion that they still hold as large a supply of cotton as they did at the close of the year 1844. In confirmation of this opinion, we would beg reference to the following table, showing the manner in which they have taken their supplies from the Liverpool market for the last two years:

Deliveries of cotton for consumption from the port of Liverpool.

	Weeks	Bales.	Bales.		
1844, Jan. 1st to May 31,	22 weeks,	467,910	or 21,269	per week	From June 1, 1844, to September 26, 1845.*
" June 1st to Dec. 31,	30 "	844,421	" 28,147	"	
	52	1,312,331	25,237	"	
1845, Jan. 1st to Sept. 26,	38 "	1,151,210	or 30,295	per week	
" Sept. 27 to Dec. 26,	13 "	245,010	" 18,847	"	
	51	1,396,220	27,377	"	

* 68 weeks—1,995,631, or 29,348 per week.

In the first twenty two weeks of the year 1844, viz: up to May 31st, and in consequence of the speculation which existed in the cotton market, the purchases made by the trade amounted to only 467,910 bales, or an average of 21,269 bales per week, by which time their stocks must no doubt have been reduced to a very low point. After this period, and up to the 31st of December, 1844, when prices continued rapidly to decline, they took their supplies much more freely; for we find that, for the remaining thirty weeks, they amounted to 844,421 bales, or a weekly average of 28,147 bales; the total quantity taken in the whole year of 1844 being 1,312,331 bales, or an average of 25,237 bales per week, whilst the estimated consumption of the year was about 24,000 bales per week, as we showed in our last annual circular. From these circumstances, and upon reference to the above table, it will be seen that from June 1st to December 31st, 1844, they must for thirty weeks have taken an average weekly supply of about 4,000 bales per week in excess of their consumption; and from January 1st to September 26, 1845, for thirty-eight weeks, allowing of 3,000 bales per week as the increased amount of consumption of 1845 over 1844, they must have still added to their previously large stocks fully 3,000 bales per week more for that period. In corroboration of this view, we would further notice the circumstance shown in the above table, that, from June 1, 1844, to September 26, 1845, a period of sixty-eight weeks, the supplies to the trade amounted to 1,995,631 bales, or 29,348 bales per week; during which time there was every inducement to increase their stocks to as great an extent as they could conveniently hold, from the circumstance of cotton ruling at very low prices; money being abundant, the demand for twist and goods very extensive, and likely to continue so, and, above all, from the increasing abilities of the trade, from the profits they have lately realized, to invest a larger amount of capital in a stock of the raw staple than they were formerly able to do so; the fluctuations to which they were in past years subjected, and from which they occasionally suffered severely,

by the action of speculations in the Liverpool cotton market, rendering it obviously to the interest (as undoubtedly it is becoming the practice of all who have the power) to maintain a large stock of cotton beforehand, so as to take advantage of the most favorable opportunities for making their purchases. The supplies of this material for the coming year appear likely to be abundant, as the advices just received from the United States indicate a probable crop of 2,300,000 to 2,400,000 bales; and as the estimated stock in Liverpool, on the 26th of December last, is 889,970, against 727,660 at the same period of 1844, (an amount greater than ever previously held at that period of the year,) there can be but little grounds for apprehension of any undue excitement in the Liverpool market which can seriously interfere with prices, notwithstanding the speculation going on in America, unless in the event of a war with that country becoming probable.

Having cursorily alluded to the principal features which have characterized the course of our market, and also the cotton market in Liverpool, during the past year, we may now glance at the particulars of our export trade in cotton manufactures. For this purpose, we beg your reference to the following table, showing the amount of exports from January 1st to November 23d, in the years 1844 and 1845 respectively, with particulars of the increases and decreases to the several markets.

Cotton yarns and sewing cottons.

Whither exported.	1844.	1845.	Increase.	Decrease.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
British North America	1, 104, 887	1, 174, 517	69, 630	
United States	605, 530	473, 778	–	131, 752
British West Indies	73, 498	87, 023	13, 525	
Mexico	33, 026	28, 540	–	4, 486
Colombia	42, 981	50, 026	7, 045	
Honduras	315, 756	69, 419	–	246, 337
St. Thomas	52, 297	65, 114	12, 817	
St. Domingo	36, 890	32, 928	–	3, 962
Cuba	58, 311	64, 647	6, 336	
Brazils	269, 847	165, 998	–	103, 849
La Plata	102, 220	67, 257	–	34, 963
Chili and Peru	94, 872	179, 054	84, 182	
China	3, 133, 034	2, 534, 344	–	598, 690
Madras and Calcutta	13, 440, 281	10, 680, 275	–	2, 760, 006
Bombay	5, 509, 816	2, 851, 721	–	2, 658, 095
Ceylon	9, 920	31, 984	22, 064	
Java, Singapore, and Manilla	611, 734	773, 590	161, 856	
Philippine islands	49, 040	6, 540	–	42, 500
New South Wales	13, 542	95, 973	82, 431	
Van Dieman's Land, S. Australia, Swan River, and New Zealand	7, 897	33, 228	25, 331	
Mauritius	17, 646	12, 594	–	5, 052
Cape of Good Hope and Algoa Bay	17, 514	21, 725	4, 211	
Gibraltar	259, 702	204, 767	–	54, 935
Coast of Africa, including Algiers	1, 000	–	–	1, 000
Malta and Ionian islands	663, 059	1, 194, 779	531, 720	
Naples and Sicily	2, 607, 539	4, 678, 079	2, 070, 540	
Austria, including Trieste and Venice	2, 645, 818	2, 261, 735	–	384, 083
Tuscany and Sardinia, including Genoa and Leghorn	2, 931, 453	3, 536, 285	604, 832	
Papal Territories	865, 320	1, 341, 062	475, 742	
Turkey and Greece, including Syra and Smyrna	8, 923, 123	5, 891, 055	–	3, 032, 068
Syria and Palestine	2, 146, 790	2, 926, 582	779, 792	
Egypt	334, 580	190, 600	–	143, 980
France	157, 609	142, 275	–	15, 334
Holland	14, 000, 647	19, 740, 610	5, 739, 963	
Belgium	3, 160, 970	3, 303, 092	142, 123	
Germany, including Hanse Towns	32, 103, 655	38, 001, 857	5, 898, 202	
Russia	24, 092, 372	18, 105, 070	–	5, 987, 302
Portugal	844, 473	840, 122	–	4, 351
Other places	2, 460, 394	3, 708, 871	1, 248, 477	
Total exports, from January 1 to November 23, in 1844 and 1845	123, 799, 043	125, 567, 117		
Total increases and decreases	–	–	17, 980, 819	16, 212, 745
Deduct decreases	–	–	16, 212, 745	
Increase, from Jan. 1 to Nov. 23, 1845	–	–	1, 768, 074	

Plain, printed, dyed, and other cotton piece goods.

Whither exported.	1844.	1845.	Increase.	Decrease.
	Yards.	*Yards.*	*Yards.*	*Yards.*
British North America - -	33, 812, 265	40, 960, 254	7, 147, 989	
United States - - -	19, 572, 775	25, 824, 493	6, 251, 718	
British West Indies - - -	22, 676, 409	35, 178, 582	12, 502, 173	
Mexico - - - -	5, 139, 324	7, 362, 525	2, 223, 201	
Colombia - - - -	5, 779, 669	9, 550, 190	3, 770, 521	
Honduras - - - -	7, 529, 915	6, 618, 081	-	911, 834
St. Thomas - - - -	9, 166, 220	22, 062, 980	12, 896, 760	
St. Domingo - - - -	3, 980, 229	6, 168, 837	2, 188, 608	
Cuba - - - -	8, 540, 308	10, 406, 258	1, 865, 950	
Brazils - - - -	76, 130, 901	71, 126, 921	-	5, 003, 980
La Plata - - - -	17, 756, 454	14, 710, 333	-	3, 046, 121
Chili and Peru - - -	24, 268, 659	49, 435, 309	25, 166, 650	
China - - - -	87, 106, 283	108, 581, 303	21, 475, 020	
Madras and Calcutta - - -	95, 494, 964	97, 067, 259	1, 572, 295	
Bombay - - - -	89, 130, 611	65, 136, 109	-	23, 994, 502
Ceylon - - - -	5, 018, 428	6, 140, 601	1, 122, 173	
Java, Singapore, and Manilla -	30, 982, 567	40, 128, 946	9, 146, 379	
Philippine islands - - -	2, 518, 293	4, 455, 726	1, 937, 433	
New South Wales - - -	3, 215, 760	5, 749, 981	2, 534, 221	
Van Dieman's Land, S. Australia, Swan River, and New Zealand -	1, 666, 539	2, 298, 918	632, 379	
Mauritius - - - -	5, 536, 006	6, 257, 314	721, 308	
Cape of Good Hope and Algoa Bay -	3, 440, 158	4, 516, 073	1, 075, 915	
Gibraltar - - - -	31, 713, 771	27, 473, 921	-	4, 239, 850
Coast of Africa, including Algiers -	3, 934, 905	2, 795, 770	-	1, 139, 135
Malta and Ionian islands - -	5, 732, 397	9, 720, 684	3, 988, 287	
Naples and Sicily - - -	3, 646, 531	4, 216, 359	569, 828	
Austria, including Trieste and Venice	10, 850, 015	12, 254, 613	1, 404, 598	
Tuscany and Sardinia, including Genoa and Leghorn - - -	30, 369, 880	27, 312, 784	-	3, 057, 096
Papal Territories - - -	4, 471, 345	3, 981, 156	-	490, 189
Turkey and Greece, including Syra and Smyrna - - -	76, 776, 048	61, 354, 411	-	15, 421, 637
Syria and Palestine - - -	20, 166, 612	27, 901, 114	7, 734, 502	
Egypt - - - -	11, 140, 641	3, 779, 094	-	7, 361, 547
France - - - -	2, 113, 699	1, 887, 418	-	226, 281
Holland - - - -	25, 195, 765	24, 605, 384	-	590, 381
Belgium - - - -	2, 859, 379	3, 169, 316	309, 937	
Germany, including Hanse Towns -	46, 860, 320	41, 113, 330	-	5, 746, 990
Russia - - - -	1, 082, 008	819, 281	-	262, 727
Portugal - - - -	40, 782, 441	31, 207, 601	-	9, 574, 840
Other places - - - -	10, 737, 178	9, 230, 818	-	1, 506, 360
Total exports, from January 1 to November 23, in 1844 and 1845 -	886, 895, 672	932, 560, 047		
Total increases and decreases -	-	-	128, 237, 845	82, 573, 470
Deduct decreases - - -	-	-	82, 573, 470	
Increase, from Jan. 1 to Nov. 23, 1845	-	-	45, 653, 375	

[The above table does not include quilting, cotton shawls, lace, hosiery, &c.]

By this table we find an increase in the quantity of yarn exported in the above-mentioned portion of 1845, over the corresponding period of 1844, of 1,768,074 lbs., or about $1\frac{1}{3}$ per cent.; whilst the increase in the export of piece goods during the same period amounts to 45,653,375 yards, or above five per cent. With reference to the exports of yarn, it will be ob-

served that the increases are chiefly to Germany, Holland, and Naples and Sicily, whilst the chief decreases have been to Madras, Calcutta, Bombay, the Levant markets, and Russia. The total amount of increase in the exportation of yarn would appear to be by no means sufficient to account for the comparatively high prices at which all descriptions of yarns have ruled throughout the year, when contrasted with piece goods, and which we have so frequently had to notice in our monthly circulars during the past year. We have previously attributed these comparatively high rates of yarn to the circumstance that, in the years 1843 and 1844, when trade began generally to revive, a much more rapid increase took place in putting down new looms than spinning machinery; which last not only involves more capital, but also requires much more time for construction; and we think the above table bears out the opinion we have before expressed, that the buoyancy of the yarn market was chiefly occasioned by the demand for the supply of the new looms. Referring to the exports of piece goods for the periods embraced in the above table, it will be found that the principal increases are to Chili and Peru, China, St. Thomas, British West Indies, Syria and Palestine, British North America, and the United States; whilst the principal decreases have been to Bombay, Turkey and Greece, Portugal, Egypt, and the Brazils. The total increase in the export of piece goods and twist shows a satisfactory progress in the state of that branch of our trade; but when it is remembered that there has been an increase in the consumption of cotton during the past year, compared with 1844, of probably 150,000 bales, or about 12½ per cent., and that of piece goods to about 5 per cent., there must be a large residue left, either for home consumption or for increase of stocks held on hand. That the latter partially exist at the present moment there can be no doubt; but not to such an extent as in any way to account for the increased consumption of cotton. In point of fact, until the panic came upon our market in the month of October, there might be said to be no stocks of any moment held by manufacturers of any description of goods; and from all we have seen, we have every reason to think that there has been a large increase in the home consumption of our manufacture throughout the year. A similar feature to the above, in the position of the home trade, is exhibited in the following table, compiled from the official accounts of the Board of Trade, of articles entered for home consumption from January 1st to November 5th respectively, in the years 1841 to 1845, inclusive.

Articles entered.		1841.	1842.	1843.	1844.	1845.
Coffee—British possessions and foreign - -	lbs.	23,654,515	23,965,212	25,171,576	26,072,645	28,828,566
Molasses - - -	cwt.	319,672	476,593	340,600	512,434	514,346
Spices - - -	lbs.	2,589,811	2,860,637	2,795,523	3,022,615	3,415,468
Sugar—all kinds - -	cwt.	3,547,149	3,401,726	3,434,049	3,494,398	4,228,113
Tobacco—unmanufactured	lbs.	18,388,187	18,153,007	18,761,978	20,217,969	21,630,006
Tea - - -	lbs.	30,509,452	31,682,975	33,522,010	34,746,893	37,264,535
Spirits—rum, brandy, & gin	galls.	2,803,247	2,584,862	2,527,745	2,569,192	2,863,789
Wine—all kinds - -	galls.	5,504,643	4,266,558	5,029,748	6,025,729	5,917,846
Silk—manufactures of Europe - - -	lbs.	–	–	244,999	273,773	289,304
Silk—manufactures of India, bandanas, &c. - -	pieces	–	–	78,971	113,890	149,816

From the above table, it will be observed that a decided increase has taken place in the consumption of all the articles specified, and which, it will be seen, embrace all the principal necessary luxuries of life, and upon which $\frac{4}{5}$ths of the total revenue derived from our imports is levied. Such a considerable increase as exhibited in most of the articles here enumerated could only have taken place, or can be maintained, whilst the great mass of the people are profitably employed, and the first necessaries of life are cheap. Whether a similar satisfactory result will be exhibited in the next and in future years, depends much upon the course which our legislature may follow on the important questions which will doubtless come under discussion in the ensuing session of Parliament. The several changes which have of late years taken place in our commercial legislation, indicate a better appreciation of what we conceive to be sound principles than formerly existed. The most important step made in this direction was the partial revision of the tariff during the past year, when the duty upon cotton wool, together with that upon 430 other articles, which yielded but trifling amounts of revenue, and including silk, hemp, flax, dye-stuffs, &c., was totally repealed, and a considerable reduction was made in the sugar duties also. This change in the tariff gave, we believe, very general satisfaction to the country, (and particularly to the commercial classes,) the more especially as it was thought to indicate but the commencement of a policy which would hereafter be more fully developed. In the proposal for a modification of the sugar duties, it was estimated that the reduction in price would lead to an increased consumption of that article, and that the total amount for the year would reach 250,000 tons, or 5,000,000 cwt., the largest previous consumption being for the year 1844, when it amounted to 207,000 tons, or 4,140,000 cwt. The above table, although embracing but ten months of the year, and only eight months during which the new scale of duties has been in operation, exhibits already an increase in the consumption over the entire year 1844; and we can have little doubt that the consumption of the whole year, under the new duties, will exceed the estimated amount. We cannot, whilst upon this subject, refrain from expressing a hope that, at no distant period, the distinction which has been continued in the late tariff, and has excluded us from availing ourselves directly of the supplies of sugar afforded by the Brazilian market and by the Spanish colonies, will be discontinued; for already has a spirit of retaliation been shown by the Brazilian government, in the increased disadvantages under which our trade has been placed, and by the curtailment of the political and civil privileges formerly enjoyed by British subjects trading with that country. In concluding our remarks upon the recent changes in the tariff, we are strongly reminded of the necessity which exists of as early a revision of the tea duties as practicable, so that we may reap the full advantage of the liberal and enlightened treaty made with us by the Chinese. Although many articles of returns will continue to offer, and probably in increasing quantities, from the Chinese ports with which we carry on trade, it is pretty evident that, for a considerable time at least, the principal article in payment for our exports must be tea—the only present limit being that of our consumption, and the extension, therefore, necessarily resting with ourselves only. When it is considered the duty now levied upon tea amounts to 2*s.* 3*d.* per lb., whilst the price of common Congon, which furnishes about two-thirds, probably, of the whole amount consumed, is now only 10*s.* per lb., the extent to which the duty enhances the cost to the consumer will be

readily understood. Although, since the year 1841, the above table shows an increase of consumption of nearly 25 per cent., and a proportionally larger increase than any other leading article specified, this only indicates the more strongly the growing favor of the population for this luxury, and the probability that the consumption would be very greatly augmented by a liberal reduction in the duty.

In looking to the future prospects of our market, it is impossible to form a very decided opinion—so much being immediately dependant upon the future policy of our legislature, the course of which, under existing circumstances, it would be almost idle to speculate upon. We therefore refrain from offering any prospective remarks of this nature.

GEORGE FRASER, SON, & CO.

January 1, 1846.

From Wilmer & Smith's European Times, January 4.

COTTONS.

Havre, *December* 31.

During the last sennight our market has worn a decidedly improved appearance, both as to the amount of business transacted and to the increased stiffness in prices, which may be considered a shade higher than our previous quotations. The formation of the British ministry has, generally speaking, created a favorable impression, and confidence seems daily to be gaining ground. The demand has therefore been rather animated, and to a good extent; and amongst the sales was a cargo of 1,700 bales expected from New Orleans, by the Osceola, taken at f. 67 all round. At this dull season of the year it is not usual to look for any great activity; but as our stock is far from large, and the internal districts are but scantily supplied, it is more than probable that early in the ensuing year the trade will be coming forward more freely, and that the transactions will then assume a spirited character. The receipt of the President's message, which has long been expected with a certain degree of anxiety, seems to have produced little impression, for, although the tone is not in a conciliatory strain, it has given no rise to any serious apprehensions as to the future. Taking a retrospective view of the year that has just closed, we find that the situation of our market has, upon the whole, been unstable; for, notwithstanding the moderate stock of cotton on hand during the last twelvemonth, speculation has, at no period, been extensive, nor of long duration; and if, in consequence of an unusual briskness, holders have had high pretensions, buyers have immediately withdrawn from the field, under the plea of the large stock in Liverpool, and the unprosperous state of the manufacturing districts. Latterly, the high price of breadstuffs, added to the fears of a dearth and of a financial crisis, have acted very prejudicially to commerce in general; but these were evidently much exaggerated, and the public mind has now completely recovered from the panic. It must, however, be admitted that if a portion of the working districts have been in a comparatively satisfactory condition, the reverse has been the case with others; and it is only to the trifling importance of a raw material that can be ascribed the steadiness in prices for some time past. By the Argo, we received yesterday

New York dates to the 11th inst., and we are hourly expecting those of the 15th by the Cambria steamer arrived at Liverpool. We now refer to the subjoined table, showing the movement in our port since the commencement of this year contrasted with former statements.

The following were the sales effected, viz:

2,852	bales	New Orleans, duty paid - - - -	f. 47 to 76
409	do	Mobile - - - - - -	52 to 68.50
2,250	do	Upland - - - - - -	52 to 70
1,800	do	New Orleans, to arrive, duty paid - -	— to 67
650	do	Peruvian - - - - - -	— to 76
7,961	bales.		

The imports amount to 14,245 bales.

Imports, deliveries, and stock in France, from 1st January to 30th November, for the last three years.

Imports.		1845.	1844.	1843.
United States - - -		322,603	273,602	316,297
Brazil - - - -		2,046	8,180	9,246
Egypt - - - -		37,653	18,600	15,629
Other sorts - - -		12,723	21,136	25,961
Bales - - - -		376,025	321,518	367,133
Stock 1st January - - -		78,000	121,000	139,000
Bales - - - -		454,025	442,518	506,133
Deliveries 11 months - -		391,525	353,018	390,133
Stock	United States - -	45,800	63,500	87,500
	Brazil - - -	350	5,500	3,900
	Egypt - - -	10,900	6,400	10,000
	Other ports - -	5,450	14,300	14,000
Total, 30th November - -		62,500	89,500	116,000

1.—*Statement of the quotations of cotton-wool in Liverpool, at the close of each week in the year 1845; also, of the weekly amount of sales, and proportion on speculation.*

	January.					February.				March.			
	3d.	10th.	17th.	24th.	31st.	7th.	14th.	21st.	28th.	7th.	14th.	20th.	28th.
	d.	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*
Upland, fair - - -	4¼	4⅛	4¼	4⅛	4⅛	4⅛	4⅜	4⅜	4½	4⅝	4½	4⅜	4¼
New Orleans, fair - -	4⅝	4⅝	4⅝	4⅝	4⅝	4⅝	4⅝	4⅝	4¾	5	4⅞	4¾	4½
Sea island - - -	10 a 30	10 a 30	10 a 30	10 a 30	10 a 30	10 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30
Pernambuco - - -	4⅞ 7	5 7	5 7	5 7	5 6½	5 6½	5 6½	5 6½	5 6½	5⅛ 6½	5⅛ 6½	5⅛ 6½	5⅛ 6½
Maranham - - -	4¼ 5½	4⅜ 5½	4⅜ 5½	4⅜ 5½	4⅜ 5½	4⅜ 5½	4¼ 5½	4⅜ 5½	4¼ 5½	4¼ 5¾	4¼ 5¾	4¼ 5¾	4¼ 5¾
Egyptian - - -	5 9	5 9	5 9	5 9	5 10	5 10	5 10	5 10	5¼ 10	5¼ 10	5½ 9½	5½ 9½	5½ 9½
Surat - - -	2¼ 4	2¼ 4	2¼ 4	2¼ 4	2¼ 4	2¼ 4	2¼ 4	2¼ 4	2⅛ 4	2¼ 4	2¼ 4	2¼ 4	2¼ 4
West India - - -	3¾ 6½	3¾ 6½	3¾ 6½	3¾ 6	3¾ 6	3¾ 6	3¾ 6	3¾ 6	3¾ 6	4 6	4 6	4 6	4 6
Amount of sales - -	12,080	28,300	43,910	44,600	33,520	39,850	55,950	35,720	42,080	71,520	33,700	18,950	28,920
Proportion on speculation -	3,500	1,000	6,000	3,000	4,800	8,850	25,300	15,000	17,750	33,000	12,000	5,500	2,500

STATEMENT—Continued.

	April.				May.					June.			
	4th.	11th.	18th.	25th.	2d.	9th.	16th.	23d.	30th.	6th.	13th.	20th.	27th.
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Upland, fair - - -	4¼	4¼	4⅛	4⅜	4⅜	4⅜	4⅛	4¼	4½	4⅛	4⅛	4¼	4¼
New Orleans, fair - -	4½	4½	4½	4⅞	5	4⅞	4¾	4¾	4¾	4⅝	4¾	4¾	4¾
Sea island - - -	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30
Pernambucco - - -	5⅛ 6½	5¼ 6½	5¼ 6½	5½ 7	5⅜ 7	5⅜ 7	5¼ 7	5¼ 7	5¼ 7	5¼ 7	5¼ 7	5¼ 7	5¼ 7
Maranham - - -	4¼ 5¾	4¼ 5¾	4¼ 5¾	4⅛ 5¾	4 5¾	4 5¾	4 5⅝	4 5¾	4 5¾	4 5¾	4 5¾	4 5¾	4 5¾
Egyptian - - -	5½ 9½	5½ 9½	5½ 9½	5½ 9	5½ 9	5½ 9	5½ 8½	5⅝ 8½	5⅝ 8½	5⅝ 8½	5⅝ 8½	5¾ 9	5¾ 9
Surat - - -	2¼ 4	2¼ 4	2¼ 4	2⅜ 4	2¼ 4	2¼ 4	2¼ 4	2¼ 4	2¼ 4	2¼ 4	2¼ 4	2 4	2 4
West India - - -	4 6	4 6	4 6	4¼ 6¼	4¼ 6¼	4¼ 6¼	4 6	4 6	4 6	4 6	4 6	4 6	4 6
Amount of sales - -	50,450	46,530	41,910	72,450	51,220	61,110	25,400	37,420	40,190	29,000	43,870	47,870	41,670
Proportion on speculation -	9,500	8,700	7,500	39,100	29,700	27,000	5,200	5,000	5,000	1,750	8,100	11,000	11,900

STATEMENT—Continued.

	July.				August.					September.			
	4th.	11th.	18th.	25th.	1st.	8th.	15th.	22d.	29th.	5th.	12th.	19th.	26th.
	d.	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*
Upland, fair - - -	4¼	4¼	4⅜	4⅜	4⅜	4⅜	4½	4⅜	4½	4⅝	4⅝	4⅝	4⅝
New Orleans, fair - -	4¾	4¾	4⅞	4⅞	4⅞	4⅞	5	5	5	5⅛	5⅛	5⅛	5⅛
Sea island - - -	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30
Pernambuco - - -	5¼ 7	5¼ 7	5½ 7	5¾ 7	5¾ 7	5¾ 7	6 7½	6 7½	6 7½	6¼ 8	6¼ 8	6¼ 8	6¼ 8
Maranham - - -	4 5¾	4 5¾	4 5¾	4 5¾	4 5¾	4 5¾	4 5¾	4 5¾	4 5¾	4 6	4 6	4 6	4 6
Egyptian - - -	5¾ 9	5¾ 9	5¾ 9	5¾ 9	5¾ 9	5¾ 9	5¾ 9	5¾ 9	5¾ 9	5¾ 10	5¾ 10	5¾ 10	5¾ 10
Surat - - - -	2 4	2 4	2 4	2 4	2 4	2 4	2 4	2 4	2 4	2 4	2 4	2 4	2 4
West India - - -	4 6	4 6	4 6	4 6	4 6	4 6	4 6	4 6	4 6	4 6	4 6	4 6	4 6
Amount of sales - -	60,999	65,020	72,690	46,780	32,970	36,960	41,990	32,040	48,930	64,250	32,980	38,500	26,400
Proportion on speculation -	19,000	26,900	37,100	12,300	7,600	8,400	8,400	6,350	13,700	31,300	14,000	11,700	6,500

STATEMENT—Continued.

	October.					November.				December.			
	3d.	10th.	17th.	24th.	31st.	7th.	14th.	21st.	28th.	5th.	12th.	19th.	26th.
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Upland, fair - - -	4½	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4¼	4⅛	4⅛	4⅛	4⅛
New Orleans, fair - -	5	4⅞	4⅞	4¾	4¾	4¾	4¾	4¾	4⅝	4½	4½	4½	4½
Sea island - - -	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30	9 a 30
Pernambuco - - -	6¼ 8	6¼ 8	6¼ 8	6¼ 8	6 8	6 8	6 8	6 8	6 8	5¾ 7½	5¾ 7½	5⅝ 7½	5¼ 7½
Maranham - - -	4 6	4 6	4 6	4 6	4 6½	4 6½	4 6½	4 6½	4 6½	4 6½	4 6½	4 6½	4 6½
Egyptian - - -	5¾ 10	5¾ 10	5¾ 10	5¾ 10	5⅝ 10	5⅝ 10	5⅝ 10	5½ 10	5½ 10	5½ 10	5½ 10	5¼ 10	5¼ 10
Surat - - - -	2 4	2 4	2 4	2 4	2 4	2 4	2 4	2 4	2 4	2 4	2 4	2 4	2 4
West India - - -	4 6	4 6	4 6	4 6	4 6	4 6	4 6	4 6	4 6	4 6	4 6	4 6	4 6
Amount of sales - -	23,930	16,750	20,000	17,340	18,070	15,970	35,560	15,540	37,870	25,460	26,440	20,430	23,520
Proportion on speculation -	1,500	2,500	5,000	4,500	5,500	1,000	12,000	3,000	12,500	500	500	740	1,500

2.—*Statement of the extreme prices in each year, from 1806 to 1845.*

	1806.		1807.		1808.		1809.		1810.		1811.		1812.		1813.	
	Good.		Good.		Good.		Good.		Good.		Good.		Good.		Good.	
	d.	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d*	*d.*	*d.*	*d.*	*d.*
Upland -	15	21½	15½	19	15½	36	14	34	14½	22½	12¼	16	13	23½	21	30
New Orleans	17	24	18	21	17½	37	17	36	16½	23½	13½	17½	14	26	23	31
Sea island -	30	37	26	30	28	58	28	69	26	33	22	30	25	40	37	48
Pernambuco	23½	29	24½	26½	25½	42	22½	38	23	29	18	23½	19	27½	24	34
Maranham -	21½	26	22½	24¼	22	38	19½	36	20	27	14¼	20¼	16	26	22	33
Surat -		17	–		14	25½	11	26	12½	19	10½	13	12	16	15½	20
Demarara -	22	26½	22	24	23	40	20	40	21½	28	17	21½	17¾	27½	24	33

	1814.		1815.		1816.		1817.		1818.		1819.		1820.	
	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
	d.	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*
Upland -	23	37	18	25½	17	21½	20	23¼	19½	22	12½	19¾	11	13¾
New Orleans	29	39	21	31	22	24	20	25½	20½	25	15½	21	14	17
Sea island -	42	72	33	57	36	40	30	36	36	54	36	48	28	36
Pernambuco	28¼	41	25½	37	24	30	24	27¾	23	27	18	23½	13	18¼
Maranham -	26½	39	23½	33	22½	28	23	26	20½		16	21	11¾	16½
Surat -	18	25	14½	21	15	18½	17½	20	14	20½	10½	14½	9½	12
Demarara -	27½	39½	24	35	23½	29½	23½	26½	24	30	18	24	14	19

	1821.		1822.		1823.		1824.		1825.		1826.		1827.	
	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
	d.	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*
Upland -	10	11½	8¼	11	8½	10¾	8¾	10½	9½	19½	6¾	8¾	6¾	7¾
New Orleans	12½	14	10½	12½	11	13	11	13	12	22	8	11½	8¾	9½
Sea island -	26	30	24	28	22	24	22	27	27	42	20	30	18	20
Pernambuco	12¼	14¼	10¾	12½	11½	14¼	11¾	13	12¼	23½	10¾	12	9	11
Maranham -	11½	13¼	9½	11½	10¼	13½	10¾	11⅜	11¼	22½	9½	10¾	8	9¾
Egyptian -	8½	9¼	7¼	8½	7¼	8½	11	12½	12	24	8½	11	8	8½
Surat -	13	14	10½	13	11½	14	7	8	7¾	16	6	7	5½	6½
Demarara -	–		–		–		12	13	12½	24	10½	12¼	9½	11

	1828.				1829.				1830.			
	d.	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*
Upland -	5 a	6⅜	6⅛ a	7⅜	4⅝ a	6¼	5¾ a	7	5⅝ a	7	6½ a	7⅞
New Orleans	5½	8	6¼	9	4¾	7½	6	9	5⅞	8	6¾	9
Sea island -	10	18	12½	22	9	18	12	21	11¼	20	12	20
Pernambuco	7½	8½	8¼	9¼	6⅜	7¼	7½	8½	7¼	8	8½	9½
Maranham -	7¼	7¾	7¾	8¼	5⅝	6½	7¼	7¾	6⅝	7	7¾	8⅜
Egyptian -	6¾	8½	7¼	9	5⅞	7½	7	8½	6½	8¼	8¼	10
Surat -	3½	5	3⅞	5½	2⅞	4½	3½	5½	3	5½	4½	6
Demarara -	6¾	9	6¾	9½	5¼	8	6¾	9	5½	8	7	10

STATEMENT—Continued.

	1831.				1832.				1833.				1834.				1835.				1836.				1837.			
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Upland -	$4\frac{3}{4}$ a	$6\frac{7}{8}$	$5\frac{3}{4}$ a	$7\frac{1}{4}$	5 a	7	$6\frac{5}{8}$ a	8	$6\frac{1}{2}$ a	$7\frac{7}{8}$	$9\frac{3}{4}$ a	$12\frac{1}{2}$	$7\frac{1}{4}$ a	$8\frac{7}{8}$	$9\frac{1}{8}$ a	11	$6\frac{7}{8}$	$10\frac{1}{4}$	$9\frac{5}{8}$	$13\frac{1}{4}$	$7\frac{1}{8}$ a	$10\frac{1}{2}$	9 a	12	$4\frac{1}{4}$ a	$7\frac{1}{4}$	$7\frac{1}{2}$ a	11
New Orleans	5	$7\frac{1}{2}$	$6\frac{1}{2}$	8	$5\frac{1}{2}$	8	$6\frac{3}{4}$	9	$6\frac{1}{2}$	9	$9\frac{7}{8}$	14	$7\frac{1}{4}$	10	$9\frac{1}{8}$	$12\frac{1}{2}$	$6\frac{3}{4}$	12	$9\frac{3}{4}$	$14\frac{1}{2}$	7	12	$9\frac{1}{4}$	14	$4\frac{1}{4}$	9	$7\frac{1}{2}$	13
Sea island -	$9\frac{1}{2}$	18	$10\frac{3}{4}$	18	$9\frac{1}{2}$	18	11	18	$10\frac{1}{2}$	18	14	22	$13\frac{1}{2}$	20	18	26	14	30	21	33	14	30	19	36	12	30	18	40
Pernambuco	$6\frac{3}{4}$	$8\frac{1}{4}$	$7\frac{3}{8}$	$8\frac{3}{4}$	$7\frac{3}{8}$	$8\frac{3}{4}$	$9\frac{1}{4}$	$10\frac{1}{2}$	$8\frac{1}{2}$	$9\frac{3}{4}$	$12\frac{1}{4}$	$14\frac{1}{4}$	$9\frac{5}{8}$	11	$12\frac{3}{4}$	$14\frac{1}{2}$	10	13	16	18	10	13	$12\frac{1}{4}$	$15\frac{1}{2}$	$7\frac{1}{2}$	$10\frac{1}{2}$	$10\frac{1}{2}$	13
Maranham -	$6\frac{1}{8}$	$7\frac{1}{8}$	7	$7\frac{3}{4}$	6	$7\frac{7}{8}$	8	$9\frac{5}{8}$	$7\frac{5}{8}$	$9\frac{1}{8}$	$11\frac{1}{4}$	$13\frac{1}{8}$	$8\frac{3}{4}$	$10\frac{1}{2}$	12	$13\frac{1}{4}$	10	12	14	$16\frac{1}{2}$	$9\frac{3}{4}$	12	$11\frac{1}{4}$	14	7	$9\frac{1}{2}$	$9\frac{3}{4}$	13
Egyptian -	7	$8\frac{1}{2}$	8	$9\frac{1}{2}$	7	9	$8\frac{1}{2}$	$9\frac{1}{2}$	$8\frac{1}{4}$	$9\frac{1}{2}$	13	15	12	$12\frac{1}{4}$	$15\frac{1}{2}$	$16\frac{1}{2}$	$10\frac{7}{8}$	13	20	21	11	14	14	18	$7\frac{1}{2}$	12	12	17
Surat -	$3\frac{1}{2}$	$4\frac{3}{4}$	$4\frac{1}{2}$	$5\frac{3}{4}$	$3\frac{1}{2}$	$4\frac{3}{4}$	$4\frac{1}{8}$	$5\frac{1}{2}$	$4\frac{1}{4}$	$6\frac{1}{8}$	7	$8\frac{3}{4}$	5	$7\frac{1}{4}$	$6\frac{3}{4}$	$8\frac{3}{8}$	6	8	7	9	$3\frac{1}{2}$	$7\frac{1}{2}$	6	9	$2\frac{5}{8}$	6	4	$7\frac{1}{2}$
Demarara -	6	9	$6\frac{1}{2}$	10	6	$9\frac{1}{2}$	7	10	$7\frac{1}{2}$	$10\frac{1}{2}$	$10\frac{1}{2}$	13	8	11	$11\frac{1}{2}$	$15\frac{1}{2}$	10	14	12	17	9	13	11	15	8	13	10	14

	1838.				1839.				1840.				1841.				1842.				1843.				1844.				1845.			
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Upland -	5	$8\frac{1}{4}$	$6\frac{3}{4}$ a	$9\frac{1}{2}$	$5\frac{3}{4}$ a	$7\frac{1}{2}$	8 a	$10\frac{1}{4}$	$4\frac{1}{2}$ a	$6\frac{5}{8}$	6 a	$7\frac{1}{4}$	$4\frac{1}{4}$ a	7	6 a	$7\frac{3}{4}$	$3\frac{1}{4}$ a	$6\frac{3}{4}$	$3\frac{1}{4}$ a	7	$3\frac{1}{4}$ a	$6\frac{1}{2}$	$4\frac{1}{4}$ a	$6\frac{1}{2}$	3 a	$5\frac{1}{4}$	5 a	$6\frac{3}{4}$	3	5	$3\frac{1}{4}$	$5\frac{3}{4}$
New Orleans	5	$9\frac{1}{2}$	$6\frac{3}{4}$	10	$5\frac{3}{4}$	9	8	11	$4\frac{1}{2}$	$8\frac{1}{2}$	6	9	$4\frac{1}{4}$	$8\frac{1}{2}$	6	$8\frac{1}{2}$	$3\frac{1}{4}$	$8\frac{1}{2}$	$4\frac{3}{8}$	9	$3\frac{1}{4}$	8	4	$8\frac{1}{2}$	$2\frac{5}{8}$	7	5	$8\frac{1}{2}$	3	7	$3\frac{1}{4}$	8
Sea island -	14	30	15	33	14	36	15	36	10	28	14	36	10	24	12	28	$7\frac{1}{2}$	24	$9\frac{1}{2}$	24	7	24	10	24	9	24	11	30	9	30	10	30
Pernambuco	$8\frac{1}{4}$	$9\frac{1}{2}$	$9\frac{1}{2}$	11	$8\frac{1}{4}$	$9\frac{1}{2}$	10	$11\frac{1}{2}$	$8\frac{1}{4}$	$9\frac{1}{4}$	$9\frac{1}{2}$	$10\frac{1}{2}$	$7\frac{1}{4}$	$8\frac{1}{2}$	9	10	$6\frac{3}{8}$	$7\frac{3}{4}$	$7\frac{1}{2}$	$8\frac{3}{4}$	$5\frac{3}{8}$	$6\frac{1}{2}$	$6\frac{1}{4}$	$7\frac{3}{4}$	$4\frac{3}{4}$	$6\frac{1}{4}$	$6\frac{1}{2}$	8	$4\frac{7}{8}$	$6\frac{1}{2}$	$6\frac{1}{4}$	8
Maranham -	7	$9\frac{1}{4}$	$8\frac{1}{2}$	10	8	$9\frac{1}{4}$	9	11	$7\frac{1}{4}$	9	$8\frac{3}{4}$	10	$5\frac{5}{8}$	$7\frac{3}{4}$	8	$9\frac{1}{2}$	5	$6\frac{3}{4}$	$5\frac{5}{8}$	$7\frac{3}{4}$	$4\frac{3}{8}$	6	5	$6\frac{3}{4}$	$4\frac{1}{8}$	$5\frac{1}{2}$	$5\frac{3}{4}$	$7\frac{1}{4}$	4	$5\frac{3}{4}$	$4\frac{3}{8}$	$6\frac{1}{2}$
Egyptian -	$8\frac{1}{4}$	$12\frac{1}{4}$	$11\frac{1}{2}$	$16\frac{1}{2}$	$10\frac{3}{4}$	14	$14\frac{1}{2}$	19	8	11	$10\frac{1}{2}$	14	$7\frac{1}{4}$	$10\frac{1}{4}$	$9\frac{1}{2}$	$12\frac{1}{2}$	6	8	7	$10\frac{1}{2}$	$4\frac{3}{4}$	$7\frac{1}{2}$	$6\frac{1}{8}$	8	$5\frac{1}{4}$	8	$7\frac{1}{4}$	9	5	$8\frac{1}{2}$	$5\frac{3}{4}$	10
Surat -	$3\frac{3}{4}$	6	5	$6\frac{1}{2}$	4	$6\frac{1}{4}$	6	$7\frac{3}{4}$	$3\frac{1}{4}$	$5\frac{1}{4}$	$4\frac{1}{2}$	$6\frac{1}{4}$	3	5	$4\frac{1}{4}$	$6\frac{1}{4}$	$2\frac{3}{4}$	$4\frac{3}{4}$	$3\frac{1}{4}$	5	$2\frac{1}{2}$	$4\frac{1}{4}$	3	$4\frac{3}{4}$	$2\frac{1}{4}$	4	$3\frac{7}{8}$	5	2	4	$2\frac{1}{4}$	4
Demarara -	8	13	8	13	$6\frac{1}{2}$	12	9	15	7	11	8	13	7	$10\frac{1}{2}$	8	12	$5\frac{1}{2}$	$8\frac{1}{2}$	7	$10\frac{1}{2}$	5	8	7	9	$4\frac{1}{4}$	8	$7\frac{1}{2}$	10				

3.—*Import of cotton-wool into Great Britain in the year* 1845.

	LIVERPOOL.											
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Growth of the United States, from—												
New Orleans and Natchez - -	73, 731	49, 981	72, 753	45, 152	41, 240	115, 908	67, 923	30, 793	4, 306	-	29, 648	58, 607
Mobile - - - -	9, 567	15, 939	35, 049	45, 281	29, 456	61, 829	24, 184	14, 716	-	-	-	6, 163
Florida - - - -	1, 374	4, 811	8, 585	5, 670	5, 130	14, 116	5, 865	1, 828	1, 617			
Savannah and Darien - -	16, 586	16, 925	9, 837	21, 591	16, 117	31, 493	18, 072	3, 276	-	-	1, 220	3, 421
Charleston - - - -	35, 843	8, 544	13, 521	22, 224	21, 763	36, 830	28, 071	7, 804	1, 162	1, 424	8, 620	12, 271
Other ports - - - -	13, 954	7, 858	10, 194	23, 793	18, 825	25, 025	12, 781	7, 644	9, 993	8, 564	14, 543	5, 883
Total American - -	151, 055	104, 058	149, 939	163, 711	132, 531	285, 201	156, 896	66, 061	17, 078	9, 988	54, 031	86, 345
Brazil and Portugal - - -	18, 538	8, 665	5, 298	6, 580	5, 986	10, 301	14, 524	2, 419	8, 029	11, 142	13, 135	5, 559
Mediterranean - - - -	3, 334	2, 467	2, 002	531	5, 292	10, 805	15, 506	7, 189	11, 243	5, 523	7, 533	8, 282
East Indies - - - -	4, 652	9, 942	8, 213	6, 319	9, 712	1, 913	4, 627	3, 099	5, 126	15, 940	5, 662	4, 435
Demarara, West Indies, &c. - -	301	790	171	422	1, 424	595	927	497	685	-	258	244
Total packages - -	177, 880	125, 922	165, 623	177, 563	154, 945	308, 815	192, 480	79, 265	42, 161	42, 593	80, 619	104, 865

STATEMENT—Continued.

	LIVERPOOL.		LONDON.		BRISTOL AND HULL.		SCOTLAND.		TOTAL IMPORT INTO GREAT BRITAIN.	
	Total import of cotton-wool.									
	1845.	1844.	1845.	1844.	1845.	1844.	1845.	1844.	1845.	1844.
Growth of the United States, from—										
New Orleans and Natchez	590,042	497,799								
Mobile	242,184	184,726								
Florida	48,996	23,843	5,300	3,400	18,400	18,500	99,000	67,100	1,499,600	1,246,924
Savannah and Darien	138,538	114,768								
Charleston	198,077	137,179								
Other ports	159,057	199,609								
Total American	1,376,894	1,157,924	5,300	3,400	18,400	18,500	99,000	67,100	1,499,600	1,246,924
Brazil and Portugal	110,176	112,369	-	200	-	-	-	300	110,200	112,869
Mediterranean	79,707	63,221	200	700	-	-	2,100	2,800	82,000	66,721
East Indies	79,640	142,796	61,400	70,400	4,700	6,900	9,400	17,500	155,100	237,596
Demarara, West Indies, &c.	6,314	14,674	1,400	1,900	-	-	1,100	900	8,800	17,474
Total packages	1,652,731	1,490,984	68,300	76,600	23,100	25,400	111,600	88,600	1,855,700	1,681,584

NOTE.—Increase of import in 1845, 174,116.

4.—*Import of cotton-wool into Liverpool, from the year* 1791, *in packages.*

In 1791 -	68, 404	In 1799 -	89, 784	In 1807 -	196, 467	In 1815 -	270, 635	In 1823 -	578, 303	In 1831 -	791, 582	In 1839 -	1, 019, 229
1792 -	72, 364	1800 -	92, 580	1808 -	66, 215	1816 -	276, 715	1824 -	447, 083	1832 -	779, 071	1840 -	1, 415, 341
1793 -	24, 971	1801 -	98, 752	1809 -	267, 283	1817 -	314, 181	1825 -	706, 316	1833 -	840, 953	1841 -	1, 164, 269
1794 -	38, 022	1802 -	135, 192	1810 -	320, 594	1818 -	425, 344	1826 -	489, 204	1834 -	841, 474	1842 -	1, 249, 811
1795 -	54, 841	1803 -	140, 291	1811 -	174, 132	1819 -	365, 365	1827 -	756, 296	1835 -	970, 717	1843 -	1, 557, 597
1796 -	63, 526	1804 -	153, 126	1812 -	171, 551	1820 -	458, 736	1828 -	630, 245	1836 -	1, 023, 587	1844 -	1, 490, 984
1797 -	58, 258	1805 -	177, 508	1813 -	141, 188	1821 -	413, 182	1829 -	640, 998	1837 -	1, 036, 005	1845 -	1; 652, 731
1798 -	66, 934	1806 -	173, 074	1814 -	182, 626	1822 -	453, 732	1830 -	793, 605	1838 -	1, 328, 415		

5.—*Estimated quantity of pounds net (in millions and tenths) of cotton-wool imported into Great Britain from the year* 1801, *and at different intervals prior to that time.*

In 1701 a 1705	1.2 average of 5 yrs.	In 1801	56	In 1809	92.8	In 1817	124.9	In 1825	222. 4	In 1833	304. 2	In 1841	489.9
1716 a 1720	2.2 do do	1802	60.3	1810	136.5	1818	177.3	1826	171.5	1834	320. 6	1842	528.5
1771 a 1775	4.8 do do	1803	53.8	1811	91.6	1819	149.7	1827	271.1	1835	361.7	1843	667
1776 a 1780	6.7 do do	1804	61.9	1812	63	1820	143.9	1828	219.8	1836	410.8	1844	644.4
1781 a 1785	10.9 do do	1805	59.7	1813	51	1821	129	1829	221.8	1837	408.2	1845	716.342
1786 a 1790	25.4 do do	1806	58.2	1814	60.1	1822	142.2	1830	261.2	1838	501		
1791 a 1795	26.7 do do	1807	74.9	1815	99.3	1823	188.1	1831	280.5	1839	388.6		
1796 a 1800	37.3 do do	1808	43.6	1816	93.9	1824	143.7	1832	287.8	1840	583. 4		

6.—Import into Great Britain for the last forty years, distinguishing the growth.

	1806.	1807.	1808.	1809.	1810.	1811.	1812.	1813.	1814.	1815.
American -	124, 939	171, 267	37, 672	160, 180	246, 759	128, 192	95, 331	37, 720	48, 853	203, 051
Brazil -	51, 034	18, 981	50, 442	140, 927	142, 846	118, 514	98, 704	137, 168	150, 930	91, 055
Egyptian -										
East India -	7, 787	11, 409	12, 512	35, 764	79, 382	14, 646	2, 607	1, 429	13, 048	22, 357
West India, &c.	77, 978	81, 010	67, 512	103, 511	92, 186	64, 879	64, 563	73, 219	74, 800	52, 840
Packages -	261, 738	282, 667	168, 138	440, 382	561, 173	326, 231	261, 205	249, 536	287, 631	369, 303

	1816.	1817.	1818.	1819.	1820.	1821.	1822.	1823.	1824.	1825.
American -	166, 077	199, 669	207, 580	205, 161	302, 395	300, 070	329, 906	452, 538	282, 371	423, 446
Brazil -	123, 450	114, 518	162, 499	125, 415	180, 086	121, 085	143, 505	144, 611	143, 310	193, 942
Egyptian -	–	–	–	–	–	–	–	5, 623	38, 022	111, 023
East India -	30, 670	120, 202	247, 659	184, 259	57, 923	30, 095	19, 263	38, 393	50, 852	60, 484
West India, &c.	49, 235	44, 872	50, 991	31, 300	31, 247	40, 428	40, 770	27, 632	25, 537	31, 988
Packages -	369, 432	479, 261	668, 729	546, 135	571, 651	491, 678	533, 444	668, 797	540, 092	820, 883

	1826.	1827.	1828.	1829.	1830.	1831.	1832.	1833.	1834.	1835.
American -	395, 852	646, 776	444, 390	463, 076	618, 527	608, 887	628, 766	654, 786	733, 528	763, 199
Brazil -	55, 590	120, 111	167, 362	159, 536	191, 468	168, 288	114, 585	163, 193	103, 646	143, 572
Egyptian -	47, 621	22, 450	32, 889	24, 739	14, 752	38, 124	41, 183	3, 893	7, 277	43, 721
East India -	64, 699	73, 738	84, 855	80, 489	35, 019	76, 764	109, 298	94, 698	89, 098	117, 965
West India, &c.	18, 188	30, 988	20, 056	18, 867	11, 721	11, 304	8, 490	13, 646	17, 485	22, 796
Packages -	581, 950	894, 063	749, 552	746, 707	871, 487	903, 367	902, 322	930, 216	951, 034	1, 091, 253

	1836.	1837.	1838.	1839.	1840.	1841.	1842.	1843.	1844.	1845.
American -	764, 707	844, 812	1, 124, 800	814, 500	1, 237, 500	902, 500	1, 013, 400	1, 396, 800	1, 246, 900	1, 499, 600
Brazil -	148, 715	117, 005	137, 500	99, 300	85, 300	94, 300	87, 100	98, 700	112, 900	110, 200
Egyptian -	34, 953	41, 193	29, 700	33, 500	38, 000	40, 700	19, 600	48, 800	66, 700	82, 000
East India -	219, 493	145, 174	107, 200	132, 900	216, 400	273, 600	255, 500	182, 100	237, 600	155, 100
West India, &c.	33, 506	27, 791	29, 400	36, 000	22, 300	32, 900	17, 300	17, 700	17, 500	8, 800
Packages -	1, 201, 374	1, 175, 975	1, 428, 600	1, 116, 200	1, 599, 500	1, 344, 000	1, 392, 900	1, 744, 100	1, 681, 600	1, 855, 700

7.—*Comparison of the stocks, at the close of the years* 1844 *and* 1845.

	LIVERPOOL.		LONDON.		BRISTOL & HULL.		GLASGOW.		Total imports.		Dealers & spinners.		Total unconsumed.	
	1845.	1844.	1845.	1844.	1845.	1844.	1845.	1844.	1845.	1844.	1845.	1844.	1845.	1844.
Upland - -	155, 400	126, 700	1, 700	1, 700		-	18, 600	13, 800						
Orleans - -	341, 900	261, 500		300	2, 600	3, 000	45, 100	32, 600						
Alabama - -	122, 700	101, 600	-	-	-	-			693, 100	544, 900	115, 000	110, 000	808, 100	654, 900
Sea island - -	3, 600	2, 200	-	-	-	-	800	400						
Stained do -	600	900	-	-	-	-	100	200						
Pernambuco -	16, 800	26, 700	-	200	-	-	-	-						
Maranham -	23, 600	23, 900	-	-	-	-	-	-	52, 300	62, 700	8, 000	8, 000	60, 300	70, 700
Bahia - -	11, 800	11, 800	-	-	-	-	-	-						
Other Brazils -	-	-	100	100	-	-	-	-						
Egyptian - -	62, 200	38, 100	-	-	-	-	5, 500	2, 900	67, 900	41, 400	3, 000	3, 000	70, 900	44, 400
Smyrna - -	100	200	100	200	-	-								
Surat and Madras -	141, 200	143, 900	87, 000	80, 400	2, 700	3, 000	9, 500	11, 200	241, 000	239, 200	6, 000	10, 000	247, 000	249, 200
Bengal and Manilla	-	100	600	600	-	-								
Dem. Surinam, &c. West India, &c.	5, 500	12, 000	500	1, 200	-	-	100	500	6, 100	13, 700	3, 000	4, 000	9, 100	17, 700
Total -	885, 400	749, 600	90, 000	84, 700	5, 300	6, 000	79, 700	61, 600	1, 060, 400	901, 900	135, 000	135, 000	1, 195, 400	1, 036, 900

Total unconsumed, 1st January, 1846, 453,464,000 pounds weight, average about 379 pounds per bag.
Total unconsumed, 1st January, 1845, 390,227,000 pounds weight, average about 377 pounds per bag.

8.—*General statement of the import, export, and consumption of Great Britain, in the year* 1845.

[Extracted from tables 3, 7, 9, 10, 11, and 12.]

Stock in the ports, 1st January, 1845	-	901, 900	Export to the continent and Ireland—		
Stock in dealers and spinners' hands—			American	56, 600	
England	125, 000		Brazil and West India	5, 800	
Scotland	10, 000		East India	60, 100	
		135, 000	Egyptian	300	
Import in 1845	-	1, 855, 700			122, 800
			Taken for consumption of England and Scotland, from the ports	1, 574, 400	
			Consumed in England, 1,452,300, or 27,929 bags per week; Consumed in Scotland, 122,100, or 2,348 bags per week		1, 574, 400
			Remaining on hand in the ports, January 1, 1846	-	1, 060, 400
			In dealers and spinners' hands—		
			England	125, 000	
			Scotland	10, 000	135, 000
		2, 892, 600			2, 892, 600

9.—LIVERPOOL.

Stock, 1st January, 1845			749,600
Import in 1845			1,652,700
Import from Glasgow			2,000
Import from London			600
Import from Hull			
			2,404,900
Total quantity sold in 1845, as per weekly returns		1,995,000	
Deduct proportion sold to speculators for re-sale		564,000	
		1,431,000	
Forwarded to country importers, &c.		88,500	
			1,519,500
Stock, 1st January, 1846			885,400

Taken for consumption and export in 1845		1,519,500,	or 29,221 per week.
(In 1844, 1,398,500, or 26,894 bags per week.)			
Deduct export to continent	53,400	68,200	
Deduct export to Ireland	14,800		
Taken for consumption		1,451,300,	or 27,910 per week.
Taken for the Glasgow market		30,600	
Taken for consumption in England		1,420,700,	or 27,321 per week.
In 1844		1,290,900,	or 24,825.

10.—LONDON.

Stock, 1st January, 1845		84,700
Import in 1845		68,300
		153,000
Stock, 1st January, 1846	90,000	142,000
Exported to the continent	51,400	
Exported to Liverpool	600	
Taken for consumption in England		11,000

or 212 bags per week.
(In 1844, 10,300, or 198 bags per week.)

11.—BRISTOL AND HULL.

Stock, 1st January, 1845	6,000	29,100
Import in 1845	23,100	
Stock, 1st January, 1846	5,300	8,500
Exported	3,200	
Exported to Liverpool		
Taken for consumption in England		20,600

or 396 bags per week.
(In 1844, 15,100, or 290 bags per week.)

12.—SCOTLAND.

Stock, 1st January, 1845		61,600
Import in 1845		111,600
Import from Liverpool		30,600
		203,800
Stock, 1st January, 1846	79,700	81,700
Export to Liverpool	2,000	
Taken for consumption in Scotland		122,100

or 2,348 bags per week.
(In 1844, 112,300, or 2,160 bags per week.)

13.—*Summary statement of the consumption, export, import, stock, &c. of Great Britain, for the last thirty years.*

	1816.	1817.	1818.	1819.	1820.	1821.	1822.	1823.	1824.	1825.	1826.
Average weekly consumption—											
Upland	-	-	2, 179	2, 380	2, 918	3, 292	3, 839	3, 890	4, 212	3, 713	3, 783
Orleans and Alabama	900	669	875	1, 284	1, 192	1, 389	1, 552	2, 169	2, 298	2, 442	2, 713
Sea island	-	-	289	329	409	604	652	629	754	360	369
Total American	4, 036	3, 509	3, 343	3, 993	4, 519	5, 285	6, 043	6, 688	7, 264	6, 515	6, 865
Brazil	1, 589	2, 075	2, 459	2, 456	2, 408	2, 509	2, 646	2, 577	2, 890	2, 502	1, 188
Egyptian, &c.	-	-	-	-	-	-	-	-	362	891	975
East India	207	1, 192	1, 581	1, 190	1, 518	1, 019	953	852	644	1, 096	489
Demarara, West India, &c.	656	1, 050	746	713	534	785	835	654	473	527	308
Total	6, 488	7, 826	8, 129	8, 352	8, 979	9, 598	10, 477	10, 771	11, 633	11, 531	9, 825
Average weekly consumption of England	5, 744	6, 911	7, 227	7, 387	8, 035	8, 573	9, 411	9, 686	10, 581	10, 435	8, 792
Average weekly consumption of Scotland	744	915	902	965	944	1, 025	1, 066	1, 085	1, 052	1, 096	1, 033
Average taken for consumption from Liverpool	5, 514	5, 914	6, 609	7, 064	7, 987	7, 855	8, 789	8, 900	10, 917	9, 313	10, 180
Sold to speculators in Liverpool	28, 700	33, 700	24, 600	46, 800	36, 000	32, 000	23, 000	160, 000	81, 000	458, 000	71, 000
Export	29, 300	26, 700	55, 500	66, 800	28, 400	52, 600	59, 300	35, 400	53, 600	72, 800	95, 000
Consumption	337, 400	407, 000	422, 700	434, 300	466, 900	499, 100	544, 800	560, 100	604, 900	599, 600	510, 900
Average weight of packages consumed	263	263	260	252	258	258	267	275	273	278	294
Average weekly consumption, in pack. av'g 385 lbs.	5, 964	7, 196	7, 475	7, 679	8, 253	8, 824	9, 633	9, 903	10, 697	10, 603	9, 034
Average weight of import	256	266	263	264	249	262	267	281	266	270	295
Pounds weight imported, in millions and tenths	93.9	124.9	177.3	149.7	143.9	129.0	142.2	188.1	143.7	222.4	171.5
Pounds weight consumed, do	88.7	107.0	109.9	109.5	120.3	129.0	145.5	154.1	165.2	166.8	150.2
Pounds weight in ports December 31, do	19.2	28.9	78.2	99.5	110.5	101.7	79.4	109.6	64.0	107.0	89.0
Pounds weight in Great Britain do do	-	-	93.3	111.8	127.0	113.9	93.7	117.3	80.3	115.5	110.9
Packages in Liverpool December 31	47, 000	64, 200	146, 000	127, 000	167, 200	167, 000	153, 000	261, 000	121, 000	311, 000	237, 800
Packages in Liverpool of American only	12, 000	19, 000	42, 500	26, 500	69, 500	87, 000	86, 400	186, 200	58, 700	126, 800	113, 100
Packages in Great Britain	115, 800	161, 300	351, 800	396, 800	473, 100	413, 100	342, 500	415, 800	297, 400	445, 900	422, 000
Packages in Great Britain, of American only	27, 800	37, 200	64, 500	48, 000	108, 000	123, 000	122, 000	214, 600	95, 500	150, 000	163, 100
Increase } in Great Britain, of American only, compared with preceding year	-	45, 500	190, 500	45, 000	76, 300	-	-	73, 300	-	148, 500	
Decrease } in Great Britain, of American only, compared with preceding year	-	-	-	-	-	60, 000	70, 600	-	118, 400	-	23, 900

STATEMENT—Continued.

	1816.	1817.	1818.	1819.	1820.	1821.	1822.	1823.	1824.	1825.	1826.
Packages in Great Britain 31st December, equal to weeks' consumption at the average rate of each year: American	8	11	19	13	24	23	20	32	13	23	24
Brazil	27	24	29	18	37	28	27	30	22	45	69
Egyptian	-	-	-	-	-	-	-	-	60	96	84
East India	10	52	121	241	169	197	142	131	167	77	169
West India	26	10	31	23	36	22	16	15	20	24	42
Packages in Great Britain 31st December, equal to weeks' consumption at the average rate of each year, of all kinds	18	21	43	47	53	43	33	39	26	38	43
Pounds weight of yarn exp'd, in mil'ns & tenths	-	-	16.1	16.7	23.9	23.2	28.0	27.4	33.6	32.6	42.2
Average quotation of Uplands in Liverpool	18¼d	20⅛d	20d	13½d	11½d	9½d	8¼d	8¼d	8½d	11⅝d	6¾d
Average quotation of Pernambucos do	26d	25d	25d	18⅝d	15½d	12⅝d	11⅛d	12d	11⅝d	15⅛d	10½d
Average quotation of Surats do	15⅛d	17d	15¾d	9⅝d	8½d	7⅞d	6⅞d	6¾d	6⅝d	8⅞d	5½d

	1827.	1828.	1829.	1830.	1831.	1832.	1833.	1834.	1835.	1836.
Average weekly consumption—										
Upland	4, 241	4, 990	5, 304	5, 452	5, 241	6, 219	5, 421	5, 742	5, 896	4, 787
Orleans and Alabama	3, 940	4, 210	3, 788	4, 756	5, 800	5, 321	6, 442	7, 352	7, 823	9, 204
Sea island	673	635	539	460	517	519	665	498	354	379
Total American	8, 854	9, 835	9, 631	10, 668	11, 558	12, 059	12, 528	13, 592	14, 073	14, 370
Brazil	1, 815	2, 456	3, 094	3, 602	3, 294	2, 843	2, 683	2, 665	2, 339	2, 508
Egyptian, &c.	1, 142	671	485	508	619	881	279	131	446	644
East India	664	738	658	940	765	1, 161	1, 210	1, 033	1, 069	1, 492
Demarara, West India, &c.	502	380	463	284	260	196	223	246	421	438
Total	12, 977	14, 080	14, 331	16, 002	16, 496	17, 140	16, 923	17, 667	18, 348	19, 452
Average weekly consumption of England	11, 677	12, 655	12, 729	14, 392	14, 881	15, 427	15, 248	15, 831	16, 567	17, 571

Average weekly consumption of Scotland	1,300	1,425	1,602	1,610	1,615	1,713	1,675	1,836	1,781	1,881
Average taken for consumption from Liverpool	12,164	12,714	13,089	14,127	15,346	14,906	15,780	15,848	16,806	18,495
Sold to speculators in Liverpool	67,000	96,000	41,500	65,000	35,500	90,600	268,000	222,300	145,100	152,500
Export	69,100	63,700	118,100	33,400	74,600	67,100	67,800	86,800	102,800	105,900
Consumption	674,800	732,200	745,200	832,100	857,800	891,300	880,000	918,700	954,100	1,011,500
Average weight of packages consumed	297	297	294	298	306	311	326	330	333	343
Average weekly consumption, in pack. av'g 385 lbs.	11,932	12,946	13,177	14,454	15,759	15,170	15,561	16,870	16,243	17,885
Average weight of import	303	293	297	300	310	319	327	337	331	342
Pounds weight imported, in millions and tenths	271.1	219.8	221.8	261.2	280.5	287.8	304.2	320.6	361.7	410.8
Pounds weight consumed, do	197.2	217.9	219.2	247.6	262.7	276.9	287.0	303.4	318.1	347.4
Pounds weight in ports December 31 do	129.2	112.7	80.8	91.4	81.3	76.5	66.9	63.2	73.3	92.0
Pounds weight in Great Britain do do	164.8	147.0	115.5	118.8	114.4	103.7	94.4	82.3	89.6	116.3
Packages in Liverpool December 31	342,700	295,500	203,200	258,000	212,300	198,000	180,800	145,300	184,700	204,600
Packages in Liverpool, of American only	230,200	157,600	99,400	160,800	135,800	129,200	110,600	106,000	106,000	79,000
Packages in Great Britain	572,200	525,900	409,300	415,300	386,300	330,200	300,100	245,600	280,000	364,000
Packages in Great Britain, of American only	334,900	247,800	182,400	238,800	225,200	203,000	173,600	159,500	144,300	137,500
Increase } In Great Britain, of American only,	150,200	-	-	6,000	-	-	-	-	34,400	84,000
Decrease } compared with preceding year	-	46,300	116,600	-	29,000	56,100	30,100	54,500		
Packages in Great Britain 31st December, equal to weeks' consumption at the average rate of each year — American	38	25	19	22	19	17	14	12	10	9
Brazil	53	53	35	29	26	17	24	8	18	22
Egyptian	39	64	60	31	33	16	8	17	49	34
East India	120	120	115	47	61	51	46	53	60	82
West India	35	44	25	29	24	20	17	30	18	35
Packages in Great Britain 31st December, equal to weeks' consumption at the average rate of each year, of all kinds	44	37	29	26	23	19	18	14	15	19
Pounds weight of yarn exp'd, in mil'ns & tenths	44.9	50.5	57.3	62.7	58.8	71.7	67.8	78.7	82.5	85.2
Average quotation of Uplands in Liverpool	$6\frac{1}{2}$d	$6\frac{3}{8}$d	$5\frac{3}{4}$d	$6\frac{7}{8}$d	6d	$6\frac{5}{8}$d	$8\frac{1}{2}$d	$8\frac{5}{8}$d	$10\frac{1}{4}$d	$9\frac{7}{8}$d
Average quotation of Pernambucos do	$9\frac{3}{8}$d	$8\frac{3}{8}$d	$7\frac{1}{4}$d	$8\frac{1}{4}$d	$7\frac{3}{4}$d	9d	$10\frac{3}{8}$d	$11\frac{7}{8}$d	$14\frac{1}{8}$d	$12\frac{7}{8}$d
Average quotation of Surats do	$5\frac{1}{8}$d	$4\frac{5}{8}$d	4d	5d	$4\frac{3}{8}$d	5d	$6\frac{1}{8}$d	$6\frac{5}{8}$d	$7\frac{1}{2}$d	$6\frac{3}{4}$d

51

STATEMENT—Continued.

	1837.	1838.	1839.	1840.	1841.	1842.	1843.	1844.	1845.
Average weekly consumption—									
Upland	4,438	5,505	5,464	5,346	4,581	4,489	6,463	6,144	7,243
Orleans and Alabama	10,223	11,742	9,915	13,854	12,698	12,333	14,515	25,177	17,169
Sea island	310	317	265	392	296	356	377	333	392
Total American	14,971	17,564	15,644	19,592	17,575	17,178	21,355	21,654	24,804
Brazil	2,483	2,460	2,373	1,444	1,344	1,340	1,496	2,146	2,192
Egyptian, &c.	779	781	548	540	608	544	744	1,054	1,062
East India	1,639	1,760	2,142	2,227	2,996	2,940	2,237	2,319	1,888
Demarara, West India, &c.	461	639	723	260	406	313	462	300	331
Total	20,333	23,204	21,430	24,063	22,929	22,315	26,294	27,473	30,277
Average weekly consumption of England	18,414	21,075	19,461	21,737	20,960	20,548	24,046	25,275	27,929
Average weekly consumption of Scotland	1,919	2,129	1,969	2,327	1,969	1,767	2,248	2,198	2,348
Average taken for consumption from Liverpool	19,271	22,784	19,004	22,908	20,282	21,423	24,533	25,523	27,910
Sold to speculators in Liverpool	199,000	291,500	263,000	229,000	195,800	259,200	489,700	478,800	564,000
Export	123,400	103,300	117,300	119,700	116,300	134,400	120,200	136,800	122,800
Consumption	1,057,300	1,206,600	1,114,400	1,251,300	1,192,300	1,160,400	1,367,300	1,428,600	1,574,400
Average weight of packages consumed	346	346	343	367	367	375	379	381	385
Average weekly consumption, in pack. av'g 385 lbs.	18,696	21,336	19,704	22,938	21,857	21,732	25,884	27,188	30,277
Average weight of import	347	350	348	365	365	379	382	383	386
Pounds weight imported, in millions and tenths	408.2	501.0	388.6	583.4	489.9	528.5	667.0	644.4	716.3
Pounds weight consumed, do	365.7	416.7	381.7	458.9	438.1	435.1	517.8	544.0	606.6
Pounds weight in ports December 31 do	82.1	110.1	98.5	162 9	186.6	199.9	290.3	337.7	400.8
Pounds weight in Great Britain do do	115.6	160.9	125.8	207.0	216.7	242 3	342.0	390.2	453.5
Packages in Liverpool 31st December	170,800	248,300	206,000	366,100	429,800	456,600	653,800	749,600	885,400
Packages in Liverpool, of American only	73,200	189,100	158,400	271,200	253,700	260,200	440,800	492,900	624,200
Packages in Great Britain	359,300	471,000	355,500	584,000	619,400	674,400	920,700	1,036,900	1,195,400
Packages in Great Britain, of American only	158,100	316,100	242,300	403,000	344,600	373,400	593,200	654,900	808,100
Increase } In Great Britain, of American only,	-	111,700	-	228,500	35,400	55,000	246,300	116,200	158,500
Decrease } compared with preceding year	4,700	-	115,500						

Packages in Great Britain 31st December, equal to weeks' consumption at the average rate of each year	American - -	11	18	15	21	20	22	28	30	33
	Brazil - -	17	20	9	21	37	46	49	33	28
	Egyptian - -	28	13	25	45	55	44	44	42	67
	East India - -	72	46	32	49	55	65	29	107	131
	West India - -	38	19	11	63	63	74	35	58	27
Packages in Great Britain 31st December, equal to weeks' consumption at the average rate of each year, of all kinds - - - -		18	20	17	24	27	30	35	38	39
Pounds weight of yarn exp'd, in mil'ns & tenths -		105.1	113.7	99.0	107.5	115.7	136.5	149.2	130.1	
Average quotation of Uplands in Liverpool -		7d	7d	$7\frac{7}{8}$d	6d	$6\frac{1}{4}$d	$5\frac{3}{8}$d	$4\frac{5}{8}$d	$4\frac{7}{8}$d	$4\frac{3}{8}$d
Average quotation of Pernambucos do -		$9\frac{3}{4}$d	$9\frac{3}{8}$d	10d	$9\frac{1}{4}$d	$8\frac{3}{4}$d	$7\frac{1}{4}$d	$6\frac{3}{8}$d	$6\frac{3}{8}$d	$6\frac{3}{8}$d
Average quotation of Surats do -		$4\frac{7}{8}$d	5d	$5\frac{3}{4}$d	$4\frac{5}{8}$d	$4\frac{5}{8}$d	4d	$3\frac{5}{8}$d	$3\frac{5}{8}$d	3d

Stock in Liverpool, 29th April, 1815.—Upland, 100; Orleans, 10; Sea island, 95; Pernambuco, 480; Bahia, 139; Maranham, 65; Para, 72; Demarara, 120; Surinam, 15; Domingo and Carthagena, 1,500; Giron, 50; Bourbon, 150; Surat, 600; Bengal, 22;—total, 3,418 bags; being less than half a day's consumption at the present rate and weights.

Total sales in Liverpool in two weeks, viz: 16th to 30th August, 1806, 170 bags.

14.—*Growth of America, not taking into the account the quantity remaining on hand in the interior.*

Crop of 1820-'21 -	430,000	Crop of 1827-'28 -	720,593	Crop of 1834-'35 -	1,254,328	Crop of 1841-'42 -	1,684,211
1821-'22 -	455,000	1828-'29 -	870,415	1835-'36 -	1,360,725	1842-'43 -	2,378,875
1822-'23 -	495,000	1829-'30 -	976,845	1836-'37 -	1,422,930	1843-'44 -	2,030,409
1823-'24 -	560,000	1830-'31 -	1,038,847	1837-'38 -	1,801,497	1844-'45 -	2,394,503
1824-'25 -	569,259	1831-'32 -	987,477	1838-'39 -	1,360,532		
1825-'26 -	720,027	1832-'33 -	1,070,438	1839-'40 -	2,177,835		
1826-'27 -	957,281	1833-'34 -	1,205,394	1840-'41 -	1,634,945		

NOTE.—In 1785, the import into Liverpool from America was only 5 bags; in 1786, 6 bags; in 1787, 108 bags.

15.—*Probable consumption of America.*

In 1826-'27	100,000	In 1830-'31	160,000	In 1834-'35	215,000	In 1838-'39	275,000	In 1842-'43	350,000
1827-'28	115,000	1831-'32	175,000	1835-'36	230,000	1839-'40	300,000	1843-'44	370,000
1828-'29	120,000	1832-'33	190,000	1836-'37	220,000	1840-'41	320,000	1844-'45	400,000
1829-'30	130,000	1833-'34	200,000	1837-'38	250,000	1841-'42	300,000		

LIVERPOOL, *December* 31, 1845.

GEORGE HOLT & CO., *Cotton Brokers.*

APPENDIX No. 12.

SILK.

From the New York Farmer.

Mr. Clark, (to whom we are indebted for many valuable facts,) in speaking of the silk culture in America, divides it into three periods. He says: "The first period may be said to have continued from the first introduction of the silk culture in North America, in 1623, to the close of the revolutionary war, in 1783, or for 160 years.

"The second epoch is from that event to the time when there was in this country public evidence of decisive knowledge of the multicaulis (Chinese) mulberry—or to July, 1830.

"The second epoch, then, in the history of the American silk culture, commenced in 1783. Notwithstanding the desolation generally introduced by war, which, where internal, has too frequently a continued effect, the silk enterprise was, though somewhat gradually, renewed. It was precisely at this period (1783) that the legislature of Connecticut, induced by the exertions of Dr. Aspinwall and the Rev. Dr. Styles, granted a bounty on mulberry trees and raw silk. In 1789, 300 pounds of raw silk were made in Mansfield, which in 1793 produced 365 pounds of raw silk. In 1810 the sewings and raw silk of New London, Windham, and Tolland were valued by the United States marshal at $28,503, exclusive of the amount of domestic fabrics; and double this entire amount is said to have been manufactured there in 1825. So popular indeed had silk products become about this period, that they were readily taken then as a circulating medium."

About the period of the last war, a good degree of interest existed, and many were successfully engaged in its culture. Mr. Samuel Chidsey, of Cayuga county, New York, is said to have raised, manufactured, and sold $600 worth of sewing silk in a year, and several establishments were in successful operation in Tennessee, Kentucky, and Illinois. So much interest existed at this time, that members of the House of Representatives were strongly in favor of affording govermental encouragement, and a bill was accordingly introduced, and favorably received, recommending the appropriation of $40,000 for the establishment of a Normal School for silk reeling in Philadelphia, for the gratuitous instruction of sixty young men, for two years, in the various branches of reeling, manufacturing, and dying silk. For some reason, this bill received no final action until 1832, when it was defeated by a small majority.

The third epoch, according to Mr. Clark, commenced at the time when the multicaulis, or China mulberry, became sufficiently known to induce its propagation, or about 1831–'32. This was a brief era, characterized by the wildest and most erroneous theories. It would require volumes to detail the thousand and one schemes resorted to for creating and sustaining what has been termed the *mulberry excitement—multicaulis speculation.*

The history of this visionary period is too fresh in the minds of most of our citizens to need review.

From the Southern Cultivator.

A BRIEF HISTORY OF THE SILK CULTURE IN GEORGIA.

By the Rev. William B. Stevens, of the University of Georgia. [From Harris's Memoirs of Oglethorpe.]

One of the principal designs which influenced the settlement of Georgia was the hope of thereby creating a silk-growing province, where that material for which England had so long been indebted to France, Italy, and China, could be produced in this colonial dependency.

As early as 1609, the subject engaged the attention of the adventurers to Virginia, and in a pamphlet called "Nova Brittania offering most excellent fruites by planting in Virginia," published that year, the writer says: "There are silke-wormes and plenty of mulberie trees, whereby ladies, gentlewomen, and little children, (being set in the way to do it,) may bee all imploied with pleasure, making silke comparable to that of Persia, Turkey, or any other." In 1650, Mr. Samuel Hartlib published a work entitled "Virginia Discovery of Silk Wormes, with their Benefits," in which he endeavored to show that the raising of silk was a thing very practicable in Virginia, and even asserted that as a staple it might be made superior to tobacco; in which opinion he was confirmed by the judgment of several others. That they made some advances in this culture is evident from the fact that the coronation robe of Charles II, in 1660, was made of silk reeled in that colony; and even so late as 1730, three hundred pounds of the raw material were exported from Virginia. Tobacco, however, soon assumed and maintained the ascendency, to the exclusion of this more useful and beautiful produce.

In 1703, Sir Nathaniel Johnson introduced the silk culture into South Carolina, but the astonishing success which rewarded the casual introduction of rice into the plantation, about eight years before, precluded a just interest in the undertaking, and, as a public and recognised commodity, it soon came to nought, though several persons, more for amusement than profit, still gave their attention to it; and as late as 1755, Mrs. Pinckney, the same lady to whom the province was indebted for the first cultivation of indigo ten years before, reeled sufficient silk in the vicinity of Charleston to make three dresses, one of which was presented to the princess dowager of Wales, another to Lord Chesterfield, and the third (says Ramsay, who narrates the circumstance) "is now (1809) in Charleston, in the possession of her daughter, Mrs. Horrey, and is remarkable for its beauty, firmness, and strength."

But notwithstanding these failures and the known difficulty of introducing a new branch of agriculture into a country, as was evidenced by the compulsion which was necessary by Henry IV to introduce it into France against the united voices of the merchants, traders, and even in opposition to the Duke of Sully, and also the indifference manifested in England—notwithstanding the able proclamation of King James on the subject, commending its cultivation—the trustees for the settlement of Georgia determined to make one more effort, which, if successful, would enrich both the province and the mother country. The views which they entertained, however, of making Georgia supplant every silk-growing country, were extravagant and erroneous. They expected, in fact, to supply all Europe, and to produce an article of equal strength, beauty, and value, with any made

on the continent. The Piedmontese, thought they, who pay half their silk for the rent of the mulberry trees and the eggs of the worm, or the peasants of France, burdened with political difficulty and stinted for conveniences, could not cope with the settlers of Georgia, where the mulberry trees (morus aloa) would grow in the greatest luxuriance; where timber for their fabrics was no expense; where room was abundant, and the reward sure. By this transfer, in addition to a direct saving to England of over £500,000 which she paid for this article to foreign countries, twenty thousand people were to find employment in rearing it in Georgia, and as many more at home in preparing it for market.

Among the first emigrants who sailed with Oglethorpe, from England, in November, 1732, was Mr. Amatis, from Piedmont, who was engaged by the trustees to introduce the art of silk-winding into the colony, and who, for that purpose, brought with him several Italians and some adequate machinery. White mulberry trees were planted in a portion of land on the eastern border of the city, called the trustees' garden; eggs were hatched, and silk spun "as fine as any from France or Italy." They soon, however, came to a mutual rupture, and the whole process was for a time suspended by the treachery of those employed, who broke the machinery, spoiled the seed, destroyed the trees, and then escaped to Carolina. Sufficient, however, had been wrought to test its value, and they were not discouraged by this inauspicious commencement. The trustees still adhered to their design, and, the more effectually to advance it, required of every settler that there should be on his grant ten mulberry trees to each acre.

Mr. Camuse and his wife, both Italians, with their two children, and two other individuals, were now intrusted with this business, in which they were continued six years; the first two at a salary of £60 per annum, and the last four at £100, besides the rent of a dwelling-house and garden.

In June, 1734, General Oglethorpe carried eight pounds of raw silk, the first produced in Georgia, to England, which was followed by a small trunk full of the same article on the 2d of April, 1735, and, after being made into organzine by the engine of Sir Thomas Lombe, at Derby, who said that it "proved exceedingly good through all the operations," was sent up to London on the 14th of August, 1735, when the trustees, together with Sir Thomas Lombe, waited on her Majesty Queen Caroline, and exhibited to her the elegant specimen of Georgia silk. The Queen selected a portion of this parcel to be wove into a pattern; and, being again waited on by these gentlemen and Mr. Booth, the silk weaver, on the 21st of September, she expressed "a great satisfaction for the beauty and fineness of the silk, the richness of the pattern, and at seeing so early a product from that colony;" and to express her pleasure at such a favorable result, a complete court dress was made from it, and on his majesty's next birth day she appeared at the levee in a full robe of Georgia silk.

On the return of Oglethorpe, in 1735, he renewed his endeavors to bring it into active operation. For the purpose of obtaining a sufficient quantity of seed, he allowed no silk to be reeled that year, but let the worms deposite their eggs. He required, also, that the Italian women should teach a number of the colonists, and thus render general the knowledge they could impart. The Saltzburgers at Ebenezer were the most forward to adopt his views; and in March 28, 1736, Rev. Mr. Bolzius gave one tree to each inhabitant as a present from Oglethorpe, and two of his congregation were instructed in the art of reeling by Mrs. Camuse. But though Oglethorpe

gave Mr. Bolzius trees, silk-worms, and a book of instructions, yet he confesses that he felt no interest in the business, nor inclination to pursue it.

In July, 1739, Mr. Samuel Augspourger carried over a parcel of raw silk which he received from Mr. Jones, the trustrees' storekeeper in Savannah, and which was declared by eminent judges to be "equal to any Italian silk, and worth full twenty shillings per pound."

On May 11, 1741, Mr. Bolzius, in his journal, states that "twenty girls, during the last two months, succeeded in making seventeen pounds of cocoons, which were sold on Friday last, at Savannah, for £3 8*s*." During this year General Oglethorpe advanced to Bolzius £5 for procuring trees, for which sum he obtained twelve hundred, and distributed twenty two to each family in his parish.

On May 1, 1742, fourteen pounds and fourteen ounces were sold, which brought £2 19*s*. 6*d*. Nearly half of the silk-worms died at Savannah, owing, as was then supposed, either to poison dew or warm weather.

On December 4, 1742, General Oglethorpe sent five hundred trees to Ebenezer, with the promise of more, if required. The indifference of the good Mr. Bolzius had by this time passed away, and he was now a zealous advocate for its extension. A machine was erected near his house, and two women succeeded very well, by which the people were stimulated to renewed exertions, and a public filature was contemplated. The enterprise of these Germans seemed to excite the envious disposition of Mrs. Camuse, with whom had been placed two women from Ebenezer; but the conduct of Mrs. C. in withholding information rendered their acquirement inadequate, and Mr. Bolzius withdrew them from her charge. The first parcel of silk made was sent to the trustees, who expressed themselves pleased with its quality. In 1745, the weight of cocoons was two hundred and fifty-three pounds, and of spun silk sixteen and three-quarters. In 1746, the weight of cocoons was three hundred and forty-four pounds, and of spun silk eighteen pounds. Early in this year a machine for winding, and coppers for baking, together with appropriate treatises on the art, were sent over by the trustees, but the people were indifferent and apathetic.

The Germans, however, were as active as formerly, and Mr. Bolzius, in a letter to Von Munch, dated May 6, 1747, says, that "the people last winter planted more mulberry trees than for thirteen years before," for which he promised them a bounty of one shilling for every tree which yielded one hundred pounds of leaves. The silk balls raised at this place this year were over four hundred pounds, three hundred and sixty-six pounds of which sold for £36 12*s*. 10½*d*. The amount raised in the whole colony was eight hundred and forty-seven pounds of cocoons, and sixty-two pounds of spun silk. In 1748, the Saltzburgers reared four hundred and sixty four pounds, but their small trees were destroyed, and some of the larger ones injured by the late frost. They, this year, succeeded admirably in spinning twenty-four pounds of raw silk, the want of a chimney and proper basins, which had impeded them before in their rude building, having been remedied. The president, writing to secretary Martyn, December 11, 1746, says: "The fundamental cause of its stagnation is, the unaccountable backwardness of some of our dames and damsels to employ themselves in attending to the worms during the time of feeding, which I have frequently taken notice of, and it cannot be imputed to the want of leaves."

During the same period only thirty-four pounds of spun silk were raised by the trustees' agent in Savannah. Mr. Bolzius, under date of February

15, 1749, thus writes: "The weather being now warm and pleasant, the mulberry trees have put forth their young leaves, and our people are now turning their minds towards making of silk;" and then, after expressing his surprise that so few were disposed to this culture, adds: "One reason for this reluctance is ascribed to the circumstance that, by ordinary labor, about two shillings might be obtained per day, whereas scarcely a shilling could be earned in the same time by the silk concern." Seven hundred and sixty two pounds of cocoons were raised, and fifty pounds thirteen ounces spun silk, and there were two machines erected in Mr. Bolzius's yard which drew off twenty-four ounces per day. On the 29th September, 1749, the trustees promised £2 to every woman who shall make herself mistress of the art of winding in one year. And they also gave Rev. Mr. Bolzius permission to erect ten sheds, with clay furnaces, at an expense of not more than £2 each, and ten machines for reeling, at thirty shillings each, which he says could be made better than those at Savannah for £3: they also sent them ten basins; and the good Germans felt the impulse of this substantial encouragement. In 1750, though the people in other parts of the colony mostly relinquished the silk culture, the inhabitants of Ebenezer continued vigorously employed and interested in it. On the 2d of June they received ten kettles from the trustees, one of which, and a reeling machine, were given to each mistress in the art of spinning, and two of the best artisans received £5 for giving instruction to fourteen young women; to each of whom was bestowed £1 for attention and industry.

Over a thousand pounds of cocoons were raised at Ebenezer, and seventy-four pounds two ounces raw silk made, producing (the price being then thirty shillings) over £110 sterling. As illustrative of the luxuriant growth of the mulberry, it may be interesting to state that two trees in front of the parsonage, ten years old, measured three feet eight inches in circumference. In December, of this year, eight more copper basins were received, and public confidence in the success of the undertaking seemed revived, notwithstanding Mr. Camuse and family had left the province and settled at Purysburgh, in South Carolina.

On the 25th December, 1750, Mr. Pickering Robinson, who, together with Mr. James Habersham, had been appointed, the preceding August, a commissioner to promote more effectually the culture of silk, arrived in Savannah.

Mr. Robinson had been sent to France, at the expense of the trustees, to study the management of filatures, and the necessary process for preparing the article for market, and thus, though no operative, was qualified to take the directorship of so important a branch of industry. His salary was £100 per annum, £25 for a clerk, and a tract of land was also granted him, which, in 1763, sold for £1,300.

Mr. Robinson brought with him a quantity of silk-worm seed, but all failed save about half an ounce. The commissioners determined at once to erect a filature, which should be a normal school to the whole province; and it was their opinion that it would be "a sufficient nursery to supply, in three or four years, as many reelers as will be wanted, when we make no doubt of many private filatures being erected, which can only make their culture a general staple." The dimensions were thirty six feet by twenty, rough boarded, with a loft or upper story for the spreading out of the green cocoons. It was commenced on the 4th of March, 1751. On the 1st of April, the basins were put up, and on the 8th of May the reeling

began. To encourage the colonists, the trustees proposed to purchase all the balls, and wind them at their own expense, and paid from 1*s.* 6*d.* to 2*s.* 4*d.* per pound for green cocoons. The commissioners separated the cocoons into three sorts: 1st, perfect cones; 2d, the spungy and fuzzy; and, 3d, the spotted, stained, and dupions. This management, however, gave great offence to some of the residents in Savannah and Purysburgh, and Messrs. Robinson and Habersham requested the vice president and assistants to determine the respective prices, and publicly announce the same, which they did on the 26th April, by a proclamation; wherein, by way of bounty, they promised to pay for cocoons, delivered at their store in Savannah, the following sums, namely: for cocoons made by one worm, hard, weighty, and good substance, 2*s.* per pound; for the weaker quality, pointed, spotted, or bruised, 1*s.* 3*d.*; for dupions, (those made by two worms,) 6*d.*; for raw silk, from first quality cocoons, 14*s.* per pound; for that made from second quality, 12*s.*; the product of the double cones, 6*s.* per pound; and they also offered, if delivered at the filature, for best cocoons, 3*s.* 6*d.*; for middling, 1*s.* 8*d.*; and for inferior, 1*s.* 1*d.*; a series of prices truly astonishing, when we reflect that the real merchantable worth of a pound of cocoons is scarcely ever 6*d.*

Experiments were made at the filature to ascertain the relative quantity of each of these qualities in a given weight of cocoons, and the results were, that in fifty pounds of green cocoons there were twenty-seven pounds of the first sort, ten pounds four ounces of the second, and twelve pounds twelve ounces of the third. After curing or baking, these fifty pounds weighed only forty-six pounds five ounces, showing a loss in ponderosity of nearly eight per cent. Besides the arrangement above specified, the cocoons were still further divided for the purpose of reeling into white and yellow, and these again subdivided into five each, namely: 1st, hard and weighty; 2d, little woolly and weaker; 3d, very woolly and soft; 4th, spotted and much bruised; 5th, double worms.

Mr. Camuse, son, and daughter, who, it appears, gave the commissioners no little trouble by their perverse conduct, returned to Savannah, and were engaged to labor at the filature at three shillings per day; at which Mr. Habersham exclaims, "monstrous wages!" The reelers now advanced with much proficiency, and five of them, on the 16th of May, wound off eleven pounds of cocoons each. The proportion of raw silk to the cocoons appeared, on a variety of trials, to be nearly in this ratio:

May 10, 1751,	55 lbs. cocoons,	1st quality,	produced	$117\frac{7}{8}$	ounces.
" 11,	" 8	"	"	$\frac{6}{9}$ pr thread,	$18\frac{1}{2}$	"
" 13,	" 11	"	"	produced	$21\frac{1}{2}$	"
" 15,	" 55	"	2d "	"	109	"
" 18,	" 20	"	"	"	24	"
" 22,	" 15	"	1st "	"	$20\frac{3}{4}$	"
" 22,	" 10	"	2d "	"	$13\frac{1}{2}$	"

The whole amount of cocoons raised in the province was six thousand three hundred and one pounds, of which two thousand pounds came from Ebenezer, and four thousand pounds were made at Whitefield's orphan house. Two hundred and sixty-nine pounds and one ounce of raw silk, and one hundred and sixty-one pounds of filogee, were prepared, notwithstanding over three hundred and eighty pounds were lost by vermin, fire, and mould. The expense of the culture was large this year, owing to the

erection of the filature, &c., which swelled the sum to £608 9s. 8½d. sterling. The private journals at that day, kept at Savannah and Ebenezer, acquaint us, in some measure, with the arduous nature of the commissioners' labors, and the difficulties they encountered from the want of funds, the intractableness of laborers, the novelty of the attempt, the imperfections of machinery, and the bitter opposition of those who should have sustained and encouraged them. The public duties of Mr. Habersham prevented his constant attention to this business; but the whole time of Mr. Robinson was devoted to the filature, directing the sorters, aiding the novices, advising the reelers, and in every way exerting himself to obtain success. His engagement with the trustees expired on the 30th of August, 1751; but finding that his intended departure depressed the friends of the culture, he was solicited by the local government to remain another year, and, generously sacrificing private to public interests, he complied with their request. Mr. Habersham thus speaks of Mr. Robinson: "I think him the most prudent, as well as the most capable person I ever knew to undertake such a work, and if he could be continued here, I doubt not but that he would turn out a number of well instructed reelers, who would be able to conduct filatures at Ebenezer, Augusta, and other parts of the province." So great was the confidence which the trustees had in him, that he was appointed an assistant in the government at Savannah; an honor which he declined, and in the same letter stated: "If due encouragement be not given to the culture of raw silk for the term of at least fourteen years, I positively cannot think of settling in America." These gentlemen recommended the building of a house, sixty feet by twenty-six, as a cocoonery, great loss having been experienced for the want of such a structure.

In 1752, Mr. Robinson returned to England, and his place was partially supplied by Joseph Ottolenghe, a native of Piedmont, and a proficient in his art, who came to Georgia on the 18th of July, 1751, and took charge of the filature in April, 1753. In a letter to secretary Martyn, dated September 11, 1753, Mr. Ottolenghe says that "there were fewer cocoons raised this year, as the worms mostly hatched before the trees leaved, and that 'the people were willing to continue the business.'" One hundred and ninety-seven pounds of raw silk were made this year, and three hundred and seventy-six pounds in 1754, besides twenty-four pounds of filoselle. The people of Augusta became interested in this manufacture, and entered with considerable spirit into the undertaking, promising to send hands to Savannah, yearly, to learn the art of reeling: their enthusiasm, however, soon evaporated.

On the 29th of March, 1755, a certificate signed by thirty-nine eminent silk throwsters and weavers was given to the "commissioners for trade and plantations," stating that, after examining three hundred pounds of raw silk, imported from Georgia, "we do sincerely declare that the nature and texture is truly good, the color beautiful, the thread as even and as clear as the best Piedmont (called wire silk) of the size, and much clearer and even than the usual Italian silks;" and furthermore, "it could be worked with less waste than China silk, and has all the properties of good silk, well adapted to the weaver's art in most branches."

In 1755, five thousand four hundred and eighty-eight pounds of cocoons were raised, and four hundred and thirty-eight pounds of raw silk spun. The good effects of the filature were now happily evident in the increased interest of the planters in the subject, who sent both their daughters and

young negroes to acquire the art of reeling. In 1756, three thousand seven hundred and eighty three pounds and one ounce of cocoons were received at the filature, and two hundred and sixty-eight pounds of raw silk reeled.

The liberal policy of the commissioners, who had no private ends to answer, caused them to recommend the establishment of additional filatures, and in their letter to the trustees, June 12, 1751, they advise the erection of one at Ebenezer, and another contiguous to Savannah; but Mr. Ottolenghe opposed this course, and arrogated to the one in Savannah the entire monopoly of the culture. Jealousy appears to have been very conspicuous in Mr. Ottolenghe's character, and his opposition to the Saltzburgers and depreciation of their efforts arose from this suspicious trait. He aimed to render himself solely necessary, and aspersed every thing which seemed to militate with his fancied superiority. This appears not only from letters of Governors Reynold and Ellis, but from his own correspondence, where this caution and fear of rivalry are plainly discernible. His course gave offence to the Ebenezer people, who had already erected a filature in their village; who had been at a great sacrifice to send their wives and daughters to learn the art of reeling in Savannah, and who had hoped to carry on the manufacture under their own supervision, and for their own benefit. Mr. Ottolenghe, however, overruled their views, and required all cocoons to be delivered at Savannah, and to be reeled there. Each basin at the filature had two apprentices, besides others who were employed in sorting the balls, &c., and the various operations connected with the trade employed nearly forty persons.

In 1757, over five thousand pounds of cocoons were received at Savannah, and three hundred and sixty pounds of raw silk spun, which, says Governor Ellis, would have been more if the eggs had not failed; and in a letter dated 11th of March, 1757, he says: "The raising of silk seems to be no longer a matter of curiosity; it employs many poor people, and is approaching towards a staple."

Seven thousand and forty pounds of cocoons were deposited in the filature in 1758; but while the friends of this business were rejoicing in the assured success of their experiment, they were saddened by the destruction of the filature, which took fire on the 4th of July and was totally consumed. The wound silk which had not yet been shipped, amounting to three hundred and fifty pounds, was saved, but several thousand weight of silk balls, together with much of the reeling apparatus, were destroyed. Another and more capacious building was immediately erected, and was ready for use the ensuing season.

In 1759, ten thousand one hundred and thirty-six pounds of cocoons were raised in Gorgia, four thousand pounds of which were from Ebenezer, and the proceeds of their culture alone, for the season, reached £700 sterling. The opinion of those engaged in the culture, as expressed to Dr. Jared Elliott, was, "that it was more profitable than any other ordinary business."

The cocoons delivered at the filature in 1760 weighed seven thousand nine hundred and eighty-three pounds, and there were spun eight hundred and thirty nine pounds. Mr. Ottolenghe was now honored with the full appointment of "superintendent of the silk culture in Georgia," with a salary appropriate to his station.

Five thousand three hundred and seven pounds of cocoons, and three

hundred and thirty two pounds of raw silk, were produced in 1761. Governor Wright, under date 13th of July, says: "The greatest appearance that ever they had here was destroyed in two nights' time, by excessive hard and unseasonable frosts, and there is likewise a degeneracy in the seed, as Mr. Ottolenghe tells me." These frosts occurred on the 5th and 6th of April. Parliament, this year, made a grant of £1,000 towards defraying the expenditure for the silk culture, and it was annually renewed until about 1766. By means of this gratuity, Mr. Ottolenghe was enabled to give a high price to the rearers of cocoons, and thus sustain the encouragement so judiciously commenced.

In 1762, fifteen thousand one hundred and one pounds of cocoons were delivered at the filature, and one thousand and forty eight pounds of raw silk reeled, which Mr. O. declared to be the finest and best silk ever produced in Georgia.

The year 1763 showed an increase of cocoons, but a decrease of silk, there being fifteen thousand four hundred and eighty-six pounds of the former, and only nine hundred and fifty three pounds of the latter. The occasion of this disparity was a season of cold, rainy weather towards the close of April, by which the later cocoons were injured, and rendered almost useless.

There were delivered at the filature, in 1764, fifteen thousand two hundred and twelve pounds of cocoons, notwithstanding the season was so unfavorable that Governor Wright mentions the case of one man, who expected to make from five to seven hundred pounds, who only succeeded in raising one hundred pounds of cocoons. Eight thousand six hundred and ninety five pounds were sent by the Saltzburgers, and the whole amount yielded eight hundred and ninety eight pounds of raw silk.

In addition to the grant of Parliament, a society instituted in London for the encouragement of arts, manufactures, and commerce offered certain premiums for the advantage of the British American dominions, among which were—

"For every pound of cocoons produced in the provinces of Georgia and South Carolina, in the year 1764, of a hardy, weighty, and good substance, wherein only one worm has spun, 3*d.*; for every pound of cocoons produced in the same year, of a weaker, lighter, spotted or bruised quality, 2*d.*; for dupions, 1*d.*" These premiums were to be paid under the direction of Mr. O., with proper vouchers that the same were raised in either of the provinces specified.

It was agitated, in 1765, to reduce the price of cocoons from 3*s.* to 1*s.* 6*d.* per pound, a measure which produced much dissatisfaction; and, as a consequence, there was a considerable falling off in the amount of balls and silk, only twelve thousand five hundred and fourteen pounds of the former, and seven hundred and twelve pounds of the latter, together with seven hundred and twenty pounds of filosele, being produced. To prevent the depression consequent on this reduction, Governor Wright suggested that instead of so much per pound, as formerly, the ten largest quantities should receive, the highest £50, the next greatest parcel £45, and so on, gradually decreasing with the decrease in weight, until you reach the lowest quantity, to which £10 would be awarded: thus, while the expense would be greatly lessened to the trustees, the stimulus of reward would be sufficiently sustained. This advice was not adopted, though, owing to the urgent remonstrances of those best acquainted with the business, the

reduction in the bounty was only 9*d.* instead of 1*s.* 6*d.* On the 25th of April, 1765, the following order was published in the "Georgia Gazette:"

"Notice is hereby given to all whom it may concern, that, by direction of the right honorable the lords commissioners of trade and plantations, the price usually paid for cocoons is now reduced, and that no more than 2*s.* 3*d.* per pound will be paid for cocoons raised in this province, and delivered at the public filature, this season.

"By order of his excellency the governor.

"GEO. BAILLIE, *Commissary.*"

This bounty was still further reduced in 1766, when, by order of the board of trade, only 1*s.* 1*d.* was paid per pound. The dependence of this culture on the weather was signally instanced this year, from the fact that though many who had hitherto raised cocoons abandoned it at the reduction of the bounty, yet such a large crop had never been produced before; over twenty thousand three hundred and eighty pounds of cocoons being delivered at the filature, which, however, only produced one thousand eighty nine pounds of raw silk, and eight hundred and fifty pounds of filosele. This amount of reeled silk was not at all proportionate to the weight of the cones, resulting, as Mr. Ottolenghe said in a letter to Governor Wright, October 2, 1766, "to the badness of the seed, and consequent inferiority of the worms." In 1760, the cocoons weighed only seven thousand nine hundred and eighty-three pounds, and yet eight hundred and thirty-nine pounds of raw silk were spun; at which rate, the product this year should have been about two thousand pounds.

On the 26th of June, Henry Kennan made proposals to the board of trade for carrying on the filature, but they were of a nature not at all advantageous to the culture; and Governor Wright, in his reply, on the 21st of October, disapproved of the plan, and exposed the fallacy of his scheme, which was in consequence abandoned.

In 1767, ten thousand seven hundred and sixty-eight pounds of balls were raised, and six hundred and seventy-one pounds nine ounces of raw silk spun; the decrease of cocoons being caused, first, by withdrawing of the Purysburgh cocoons, which last year amounted to five thousand five hundred and fifty-one pounds; and, second, by the reduction of bounty; so that while last year the cocoons were delivered in by two hundred and sixty-four different persons, only one hundred and sixty individuals were this year devoted to the culture. The silk, however, was of a better quality, and sustained its high reputation in the London market.

In 1768 another plan was proposed by Mr. Delamar, "in order the more effectually to establish the growth of raw silk in America." His proposal was to pay a bounty of 20*s.* per pound on every pound of good, clear, raw silk imported from any of his Majesty's dominions in America, to be paid on the price such silk might sell for at public sale in London; at the expiration of ten years ten per cent. bounty was to be allowed; the ensuing five years at five per cent., after which time the bounty was to cease. This was the general feature of his plan. It was not, however, adopted, though in many respects its provisions were highly judicious and appropriate.

But this branch of industry and commerce was fast waning before the increasing culture of more sure and lucrative products, and only one hundred and thirty-seven different persons brought cocoons to the filature this year. Governor Wright, in his official letter to the Earl of Hillsborough,

July 1, 1768, says: "I am persuaded that few, or none but the very poorer sort of people, will continue to go upon that article. Several substantial persons, who did mean to make it an object when the price was higher, have, to my knowledge, given it over. The reason, my lord, is evident; for people who have their fortune to raise or make will always turn themselves in such a way, and to the raising and making of such commodities, as they think will answer best; and it is very clear to me that those who have negroes may employ themselves and negroes to better advantage, &c., than by raising cocoons at 1*s.* 6*d.* per pound, although that is, as I have said, 7, 8, or 9*d.* more than they are intrinsically worth."

Cluny, in his "American Traveller," printed in London, 1769, says: "The climate of Georgia has been found to agree, in every respect, with the silk-worm." Experience, however, proved that the climate was not sufficiently equable to secure permanent and continued success. Governor Wright, in the letter quoted above, says "the variable and uncertain weather in spring makes it precarious," and facts amply confirm this statement. Only five hundred and forty-one pounds of raw silk were made this year; a smaller amount, with one exception, than had been produced for ten years. In 1769, the quantity was still more decreased, both from the reluctance of the people to raise worms and the unfavorable weather in spring. Governor Wright, on the 20th of June, 1769, says: "We had a most extraordinary prospect till the middle of April, when I thought every thing safe; yet we had very cold rains on the 17th and 18th, which were succeeded by hard, black frosts on the 19th and 20th, and destroyed a great part of the worms, and will reduce the silk very much."

The silk business was now on the irretrievable decline, though it still maintained a nominal existence, and received the encouragement of Parliament. The special bounty which had hitherto been paid on cocoons, over and above their merchantable value, was suspended, and, by a statute of 9 George III., c. 38, a premium of twenty-five per cent. from the 1st of January, 1770, to the 1st of January, 1777; of twenty per cent. from the 1st of January, 1777, to the 1st of January, 1784, and of fifteen per cent. from the 1st of January, 1784, to the 1st of January, 1791, on the ad valorem value of all silk produced in America and imported into Great Britain in vessels regularly navigated by law, was substituted in its place.

The inhabitants of Ebenezer resumed the culture, which with them had long been dormant, and its revival at that time was principally owing to the influence of a very worthy man and magistrate, (Mr. Wertsch) who, sanguine himself of ultimate success, had imparted to the Germans a portion of his own enthusiasm.

In 1770, they shipped two hundred and ninety-one pounds of raw silk, the result of their own industry; and as the filature at Savannah was discontinued in 1771, the Earl of Hillsborough, ever anxious to advance the produce, warmly commended the zeal of the Saltzburgers, and directed President Habersham to distribute "the basins and reels that were left in the public filature to such persons as Mr. Wertsch shall recommend to be proper objects of that bounty;" and in the same letter he promised that he would endeavor to procure for them this year "a small sum from Parliament, to be laid out in purchase of utensils for the assistance of the poor sort of people in your province." This promise he redeemed.

So popular had the silk business become at Ebenezer that Mr. Habersham, in a letter dated the 30th of March, 1772, says "some persons in al-

most every family there understand its process from the beginning to the end." In 1771, the Germans sent four hundred and thirty-eight pounds of raw silk to England, and in 1772 four hundred and eighty-five pounds, all of their own raising. They made their own reels, which were so much esteemed that one was sent to England as a model, and another taken to the East Indies by Pickering Robinson. The operations at Savannah were now totally discontinued, though Mr. Ottolenghe still styled himself "superintendent of the silk culture in Georgia," and, in consideration of his long and faithful service in that office, received an annuity of £100.

In a message of Sir James Wright to the Commons House of Assembly, 19th of January, 1774, he says: "The filature buildings seem to be going to decay and ruin; may it not, therefore, be expedient to consider what other service or use they may be put to?" And the assembly answered: "We shall not fail to consider how it may be expedient to apply the filature to some public use." And henceforth it was used as an assembly or ball-room, a place where societies held their meetings, and where Divine service was occasionally conducted. More recently it was converted into a dwelling house, and was thus appropriated at the time of its destruction by fire on the afternoon of March 25, 1839.

Thus ended the grand project for raising silk in the province of Georgia; for though some few individuals, together with the people of Ebenezer, continued to raise small quantities, yet, as a branch of general culture, it has never been resuscitated. The last parcel brought to Savannah was in 1790, when over two hundred pounds were purchased for exportation at from 8*s.* to 26*s.* per pound.

On reviewing the causes which led to the suspension of this business after so many exertions and such vast expense, which, it must be remembered, the profits of the culture never reimbursed, we find, first, the unfriendliness of the climate, which, notwithstanding its boasted excellence, interfered materially with its success. Governor Wright frequently speaks of its deleterious influence, and the fluctuations in the various seasons evidenced, to demonstration, that the interior was better adapted to the agricultural part of the business than the exposed and variable seaboard. Mr. Habersham, in a letter to the Earl of Hillsborough, dated Savannah, 24th of April, 1772, thus expresses himself on this point: "Upwards of twenty years ago, if my memory does not fail me, Samuel Lloyd, esq., of London, who was one of the late trustees for establishing this colony, and was fourteen years in Italy, and very largely concerned in the silk business, wrote to me that the best silk was produced at a distance from the seacoast, owing, I suppose, to the richness of the soil, which made the mulberry leaf more glutinous, nutritive, and healthy to the silk worm; also to their not being obnoxious to musquitoes and sand flies, and probably, likewise, to the weather being more equal and less liable to sudden transition from heat to cold; and on a conversation this day with Mr. Barnard, of Augusta, he assures me that, from two years' experience in raising cocoons there, he lost none from sickness, which frequently destroys two thirds of the worms here; and he further says that Mr. Ottolenghe told him that the silk reeled from the Augusta cocoons 'made the strongest and most wiry thread of any raised in these parts.'"

Second, the expensiveness of living and the dearness of labor, which was as high as 1*s.* 8*d.* to 2*s.* per day, whereas 2*d.* or 3*d.* was the usual price paid the peasant in silk growing countries. Governor Wright, in a let-

ter to the Earl of Hillsborough, frankly told him that, "till these provinces become more populous and labor cheaper, I apprehend silk will not be a commodity, or an article of any considerable amount."

Third, the great reduction of the bounty, which, being the stimulus to exertion, ceased to operate as an incentive, when from 3*s.* 3*d.* it fell to 1*s.* 3*d.*, and finally to a mere premium on the general quantity imported. The poor could not subsist on these prices, and the rich could employ their lands to much better advantage than in cultivating an article which would not repay the expenses of labor; and, lastly, the increasing attention bestowed on rice and cotton sealed the fate of the silk culture, and the planters soon learned to consider the latter of no importance, in comparison to the large and lucrative crops yielded by those more staple commodities. Other reasons might be mentioned, but these sufficiently account for its decline there, and its total neglect even to the present day. During the morus multicaulis epidemic, which spread over our country in 1838, Savannah, it is true, did not escape, and for a time the fever raged with much violence; but the febrile action soon subsided, leaving no permanent benefit, and only a few fields of waving foliage as a deciduous memento of this frenzied excitement.

That silk can be produced in Georgia equal to any in the world, does not admit of a doubt; but whether it will ever be resumed, and when, are among the unknown events of the future.

From the New York Farmer and Mechanic.

In the New York Farmers' Club, November 18, 1845.

SILK.

Mr. Van Epps.—The subject of bounties on silk ought now to be taken up. Our State bounty for five years will expire next June. That bounty is 15 cts. a pound for cocoons, and 50 cts. a pound for reeled silk, the produce of this State. A bushel of cocoons weighs 10 to 12 pounds. This bounty induced many persons to raise silk. If the bounty ceases they will probably quit the raising of it. Some gentlemen, I know, await the action of the State before they engage their capital in the business. Massachusetts and New York are, I believe, the only States of this Union that give such bounties. Other States have repealed their bounty acts. The business cannot yet continue without bounty. We can raise silk, but the first attempts must be fostered and patronised, or it must fail; and, besides, frost has recently almost totally killed our multicaulis trees, and we have to wait the growth of hardier kinds, adapted more to such severe frost as sometimes occurs. Confidence in the ultimate success of the silk staple in America is unabated. I move for a committee of three to prepare a memorial on the subject to the legislature.

Dr. Underhill.—Was the Broussa mulberry killed?

Mr. Wakeman.—No, sir. Broussa survives all frosts: we must have that question brought before this club for particular investigation.

Mr. Fleet.—This is the most important question that has been before this club for some time. The bounties on silk are of too short a duration. The public has not that confidence in their continuance which is abso-

lutely necessary to induce any prudent man to establish his mulberry trees, and his accommodations for the worm, &c. I am sanguine that bounties continued ten or fifteen years would secure the silk culture. I second the motion for a committee. Motion carried unanimously.

Mr. Kemble.—How long shall we ask for bounty? Ohio has none; Connecticut has none; and they produce the most silk. The bounty is equal to the cost of production. The legislature will not give you ten years! The bounty might become very great. Let the committee report their memorial at the next club.

Mr. Meigs.—If the State should pay $5,000,000 for bounty on silk at 50 cts. a pound, and the silk raised should be worth what it now is, and doubtless always will be, $5 a pound, then *the benefit to the State* would of course be about forty-five millions of dollars.

Mr. Fleet.—The memorial drawn by the committee should be reported to the next meeting of the club.

Seconded by Mr. Kemble.

Dr. Underhill.—It is admitted that 50 cts. a pound for the silk pays the cost of raising.

Mr. Van Epps.—Two dollars will pay for the trouble of raising a pound, after the establishment is ready for it.

Mr. Fleet.—To avoid injurious prejudices, I should prefer a sliding scale of bounties.

Mr. Meigs.—The infancy of a great staple may be justly compared with that of an animal. You must nurture and sustain the infant, or you will never have the strong and powerful adult. That is the true nature of bounties.

Mr. Kemble.—I am for prudence in our measures: a bounty is a help only; government ought not to do the whole. How does Ohio manage it?

Dr. Underhill.—The damage done by recent frosts to the mulberry trees will not be repaired soon; a bounty for five years would not more than repair that damage. Millions of the trees are destroyed, especially where they stood in loose soils. I think that the bounty should be continued for five years, and then reduced a quarter or a half for five more.

This club cannot take up a more interesting subject than that of the kind of mulberry best suited to our climate. Broussa stands our frosts perfectly. Italian white is also said to stand it; but multicaulis has been almost annihilated. The fatal blow was struck the winter before last, when frost entered the ground here three or four feet deep.

Mr. Van Epps.—Two dollars pay only for the labor of raising a pound of silk. The business in Ohio ought not to give the tone to the public. A hundred years ago the silk business was struggling in this country. Had it been duly encouraged, it would have been long ago a great source of national wealth.

Mr. Wakeman.—The silk raised by us has probably, when all costs are considered, really cost us about five dollars a pound. Much time and great ingenuity are requisite to establish the silk business in America. Our first attempts at making cotton cloths were full of difficulties. At first we got 25 cents a yard, then 12, (*all said we must fail,*) then 6; and yet at 6 cents a yard, after numerous expenses in money, and great ingenuity in machinery, cotton cloth is an *American article* at that very low price. We are making $40,000,000 of cotton fabrics; we can do so with silk. But the most important business of reeling silk must be yet established. Some kinds

of India silk, for want of proper reeling, are worth $2 50. French of no better quality in the cocoon, yet by good reeling, brings $5 a pound. In Ohio, silk is reeled worth it now, on a small scale.

As to multicaulis, the records of this Institute will show that years ago it was declared here that multicaulis would fail, and it has failed. We believe that *Broussa* will stand—it has been examined by us; we doubt not its physical adaptation to our northern climate.

The motion that the committee do report the memorial to the next meeting of the club was *unanimously adopted.*

The *chairman* appointed on that committee Messrs. Van Epps, Skinner, and Meigs.

From the New York Farmer and Mechanic.

SILK CULTURE.

Last stroll of the season among the mulberry patches, cocooneries, and eggeries of Northampton.

Northampton, *November* 10, 1845.

Dear Sir: You have been furnished with several strolls among the mulberry patches, cocooneries, and eggeries in Northampton, with an allusion to experiments in contemplation to show the practicability, and, if possible, the utility of late feeding, despite the use of old, crude, spotted, or frost-bitten foliage; and, if successful, the worms would go up, by or before the *memorable powder plot* of November 5th; at which time, instead of *going up*, they stayed *down*, and the finale was a total destruction of the whole family, without the intervention of gunpowder or nitrous explosion.

Having ever been of the opinion that late raised cocoons were of little or no value, the experiment was made, to show, practically, that there can be no use or profit in late feeding, and to establish the fact that *our early crop* is worth more than all the after crops when the foliage becomes crude and indigestible.

A French writer has produced evidence that 100 lbs. of seedling foliage will make as much silk as nearly double that quantity of old foliage.

The question may be asked, how early ought eggs to be brought out?

Answer.—Soon as the mulberry begins to develope its foliage.

Another question: suppose the early foliage should be cut off by frost?

Answer.—Then shift the worms to mulberry paper, or use foliage which had been dried for the purpose; pulverize, moisten, and sprinkle with a little wheat flour or rice flour, (which is preferable,) and the worms may be sustained until new foilage appears. This has been successfully tried.

An order for Canton trees or cuttings, and peanut eggs, has been received a few days since from Lima, Peru, S. A., and means to preserve the worms, should they hatch on the passage, for which purpose mulberry paper and dry mulberry foliage will be forwarded. Eggs have been forwarded to the Sandwich islands which did not hatch until they had arrived at the place of destination, five months' passage or more, where was plenty of foliage. Our motive for ordering northern eggs for Lima is, that they are considered peculiarly adapted to a warm climate, in preference to the product of that climate.

President Stiles, in his Silk Journal, advocated and recommended frequent change of stock.

The eggs which were sent to the Sandwich islands were of the peanut variety, 3,000 of which, or even less, if well fed, would give one pound of silk; but, when crossed with the native breed, required between 5,000 and 6,000 to make a pound of silk, and soon the mixture were like the native, and the same lot of the native eggs became very irregular in the time of hatching—some in ten days after being laid, others up to thirty, sixty, ninety, and others even to six months. This irregularity has been very discouraging. Such, also, has been the experience in the West India islands, as by recent intelligence. The only apparent remedy is the *frequent* or *annual* supply of northern American eggs.

Eggs sent from here to the south have done well; but when received from the south, the reverse, so far as my experience has extended, from the beginning to the end of the *stroll!*

A. C. Van Epps, Esq.

Remarks.—It was stated in this paper, a few months since, that northern eggs sent to the south generally did better than those saved there, or southern eggs sent here. This statement has been doubted and contradicted, but we have made diligent inquiry, and have yet to learn *an instance* where eggs sent south have failed, where the failure could not be traced directly to some other cause than any injury in the eggs consequent upon a change of climate. We have sent several pounds, during the last year, to the *extreme* south, and they have done *well*. They may be safely sent any part of the season, and with great advantage to the grower.

A. C. VAN EPPS.

From the New York Farmer and Mechanic.

IN THE NEW YORK FARMERS' CLUB.

* * * * * * * * *

Mr. Meigs, from the committee to whom was referred the subject of a memorial to the legislature for renewal of the bounty on the culture of silk, read the following report:

To the honorable legislature of the State of New York:

The American Institute respectfully comes before you in favor of the public, to ask for a renewal of the bounty on the production of silk in this State. The great natural staple of our land yet requires the paternal care of the State. The existing bounty, which expires in June next, has been the means of causing some attention to that important product, but competition of foreign nations, long habituated to that very delicate and very valuable product, renders, in our opinion, a still further help necessary on the part of government, to carry it from its present infant condition to maturity.

The legislature is perfectly aware that silk has long been, and will undoubtedly forever be, almost an article of necessity. Every citizen uses it, and must continue to do so; for it is admitted everywhere to be one of the most beautiful and useful materials for the dress of our race that can be found. As a thread only, it has no equal; and for beauty as a garment, no superior. And it is also now ascertained as a fact, that the United States has a climate

better adapted than any other on the globe for the production of it. It has cost our country a great many millions of dollars to buy it from the old world; and we believe it to be high time for us to make it, not only for our own immense consumption, but to try to make it for exportation, and thus cause other nations to repay us the tribute for silk which we, for generations past, have paid to them.

Difficulties besides competition have attended this new staple of our country. The experiments tried in this new business have some of them failed. Certainly, mulberry trees which came as highly recommended as the multicaulis have proved unable to bear our winters. The multicaulis has failed, to the very great damage of thousands of our patriotic citizens, who had ventured their fortunes in its trial. But it is now well known that other kinds of mulberry trees are capable of standing unhurt our hardest winters. The Broussa is one of them. We would therefore persevere, by all means; and we believe that upon further examination our State government will see the propriety of continuing its bounty for some years to come.

Upon much consideration, we have arrived at the conclusion that, if the present bounty should be continued for three years, and then be decreased ten per cent. per annum until exhausted, the production of silk in our State will be so firmly established as no longer to require the parental care of government.

If the amounts paid for such bounties should, as we hope they may, become large, it will be a source of high satisfaction to know that our citizens are enriching themselves and the State by the amount of silk produced.

And we beg leave to say that bounties for the destruction of wolves and panthers cannot wisely be considered more advantageous to the State than the production of a new staple of commerce, and lasting value, like that of silk.

Your honorable body will, in its wisdom and patriotism, supply those reasons which we may have omitted. Your memorialists therefore submit with perfect confidence and respect, for decision, this petition, which was unanimously adopted, and ordered for signatures and presentation to the legislature.

On the subject of the best mulberry tree for our climate, although the multicaulis has failed in some situations, yet the Broussa, the Italian white mulberry, and the Alpine, stand our climate well.

Mr. Van Epps.—I have used the multicaulis, the real Chinese mulberry; all that we have of this tree are descended from two plants brought from the Philippine islands. There is no failure from cold on the high lands of our country, but, for the last two years, those planted in our low lands have suffered greatly from severe frost. The stem of the multicaulis is apt to be destroyed by hard frost, but the roots are usually not hurt, and the young shoots the following year bear well. The best method is to cut off the stems with their leaves and give to the worms. They may be cut twice or thrice, and the leaves on the upper end of the stem are not so good for the worms. I cut off the upper six or eight inches; those leaves are watery; they will do to feed the young worms. Multicaulis is now almost the only mulberry used in the south, where it succeeds on low land and high land. Multicaulis has rapid growth, and gives per acre four or five times more food for worms than any other mulberry that I know of except the Broussa. I would, in the fall of the year, cut my stems down to the ground and turn a furrow over the roots. The white grafted mulberry is fine. It is suc-

cessfully done, and the result may be examined at No. 337 Broadway, in this city. A gentleman from Albany proposes to plant thirty acres of the Italian white mulberry. The silk-worm is not fond of our American red mulberry leaf.

Mr. Wakeman.—That has been tested by the Institute.

Chairman.—The morus oregana (the Oregon mulberry) is good—has large leaves; a specimen of it is possessed (I think) now by Alexander Walsh, of Lansingburgh. We ought to carefully examine that mulberry.

Mr. Van Epps.—Mr. Clark, of Philadelphia, has published the best treatise on American silk. I refer members to it for information.

Mr. Wakeman.—On the 19th June, 1828, on suggestion of the late Dr. Felix Pascalis, the American Institute commenced the undertaking to supply our country with mulberry trees. A large amount of the best seed was imported from France by the American Institute. Dr. Pascalis constantly recommended the obtaining a plentiful supply of the leaves before we undertook to employ the silk-worm. In that same year the first multicaulis was imported by Dr. Pascalis, as chairman of the silk committee of the Institute, and shown at the fair. When introduced to public notice, it was not supposed by many, as well as by myself, to be sufficiently hardy to endure our cold weather; and so has it proved generally. We must have a tree better fitted for our climate. It will not answer to have our silk-growers liable to the severe disappointments from killing frosts. They will be discouraged. Multicaulis may do for our southern States; but here we must have the Broussa. We obtained this kind from Mr. David Ruggles, of Newburgh, in 1837, who obtained it from Charles Rhind, esq., one of the commissioners by whom the late treaty was concluded between the United States and the Sublime Porte. Broussa is in the same latitude as New York; is situated at the foot of mount Olympus, the summit of which is crowned with perpetual snow. He believed that it was more hardy than either the morus multicaulis or the Italian mulberry. Mr. Rhind shipped to Mr. Ruggles several hundred of the young Broussa trees, all which perished on the voyage. In 1832 Mr. Rhind obtained seeds of that year's growth, and gave them to Mr. Ruggles, who planted them, and in 1837 he had 20,000 trees. It has proved able to bear our winters. Its leaf is as large as that of multicaulis, but thicker—more pulpy. It has stood side by side with multicaulis unhurt, while that was killed by frost.

Mr. Hyde.—I tried the white Italian mulberry in Missouri, in 1836. I planted them in a garden of rich soil; the weeds overran most of them. Such as escaped I transplanted, and now they are as large as common apple trees; and I planted slips from them, which have grown successfully. Cattle are very fond of the leaves, and some of my mulberry trees were cut down by them, but their new shoots are vigorous. I believe there is no multicaulis now living in Missouri more than ten feet high. The cold of our winters invariably kills the stalk down to the ground every year. As to the white mulberry, I have never yet seen the little ends of its branches hurt by frost. But I still think that the northern part of Massachusetts is too cold for the white mulberry. The red mulberry grows all over the west; the white grows well on land of inferior fertility. I tried the multicaulis and the white mulberry side by side.

Chairman.—The plan proposed by Mr. Van Epps is good, to cut down the stems annually and loose up the roots with the furrow of the plough.

Mr. Hyde.—We ought not to depend on the annual shoots for our supply of leaves.

Chairman.—The multicaulis tree never does attain a large size.

Mr. Hyde.—When the white mulberry tree is cut off to the root, it branches out well afterwards.

Mr. Wakeman.—We must place our reliance only upon such mulberry trees as are capable of standing all the vicissitudes of our climate unhurt. We must have a permanent tree. All the other arrangements mentioned are somewhat troublesome, and therefore very liable to neglect. The Broussa is undoubtedly our best tree. Mr. Ruggles thought that the greater solidity of the leaf rendered it fully equal to multicaulis; that the silk-worms would leave the latter to feed upon the former. I had in my garden a Broussa which grew rapidly; it was readily propagated by slips. I move for a committee to inquire after and collect the Broussa. Carried.

The *chairman* appointed on that committee Messrs. Dr. Underhill, Wakeman, Meigs, and Van Epps.

Chairman.—Let the committee inquire of Mr. Walsh for the morus oregana—it is very valuable.

Mr. Van Epps.—We are almost destitute of mulberry, and it is of the first importance to the silk business that we should have a permanent supply.

AN ACT TO ENCOURAGE THE CULTURE OF SILK.

Sec. 1. *Be it enacted by the Senate and House of Representatives of the State of Louisiana in general assembly convened,* That the treasurer of the State shall pay, out of any money in the treasury not otherwise appropriated, fifteen cents for each and every pound of silk cocoons hereafter produced within this State, and the sum of fifty cents for each and every pound of raw silk reeled in this State from cocoons raised within the State, as a premium for raising such cocoons, or reeling such silk.

Sec. 2. *Be it further enacted, &c.,* That before any person shall be entitled to receive such premiums, he shall prove to the satisfaction of the parish judge of the parish in which said persons reside, or of the district judge if no parish judge should be in office, that the cocoons were raised, or the silk was reeled, by him, or by other persons under his authority, within his said parish.

Sec. 3. *Be it further enacted, &c.,* That the parish judge, or district judge, as the case may be, may examine such persons on oath or otherwise; and he shall be fully satisfied that such persons did raise the cocoons, and did reel within said parish such raw silk, from cocoons reared within this State. The said parish judge shall thereupon give such persons a certificate of the facts so proved to him, that neither the said cocoons nor reeled silk, nor any part thereof, has ever been presented or offered before for the purpose of obtaining a premium thereon as allowed by this present act, which certificate the treasurer of the State shall receive and pay.

Sec. 4. *Be it further enacted, &c.,* That a parish judge, or district judge, as the case may be, shall be entitled to receive, for every certificate given by him by virtue of this act, twenty-five cents, to be paid by the person receiving the certificate.

Sec. 5. *Be it further enacted, &c.*, That any person violating the provisions of this act, by attempting to procure certificates more than once, or allowing the use of the cocoons or raw silk to any person else, for the purpose of procuring another certificate, one having been granted, shall be deemed guilty of swindling, and on conviction thereof, as in other cases of swindling, under the criminal laws of this State, shall undergo confinement for swindling; and the person applying for a certificate, knowing one had already been granted to another person for the same cocoons, or raw silk, shall be likewise deemed guilty of swindling, and punished, on conviction, as the criminal laws of the State prescribe for perjury.

Sec. 6. *And be it further enacted, &c.*, That this act shall be in force five years.

A. BOUDOUSQUIE,
Speaker of the House of Representatives.
FELIX GARCIA,
President of the Senate.

Approved March 10th, 1845.

A. MOUTON,
Governor of the State of Louisiana.

From the New York Farmer and Mechanic.

SILK CULTURE.

A number of valuable communications have been received since the last number was issued, (several of which are of great interest,) from gentlemen at the *extreme south.* They show an increasing attention to the culture of silk. The only obstacle named in any of them is the "want of a market," and applications have been made by growers in Georgia and Tennessee to send their cocoons to our *filature.* The following, from Thomas Douglas, esq., of Macavriz, East Florida, to the Hon. D. Levy, will be read with much interest. We are happy in being able to inform our friends that branch filatures will probably be established during the ensuing season in Georgia and Tennessee. Communications from Dr. D. Stebbins, of Mass., and Judge Ernest, of Georgia, Mr. Massey, of Alexandria, and others, will appear in due time.

In speaking of the Farmers and Gardeners' Convention, and Silk Growers' Convention, in previous articles, we referred to those held under the auspices of the American Institute, October last.

A. C. VAN EPPS.

Macavriz, *East Florida.*

Dear Sir: Although my experiments in the silk culture may be of little value, yet, added to the general stock which is now being gathered up by those who feel a solicitude for the success of this branch of agriculture, they may be of some service, especially to our Territory, in all that concerns which you take so deep an interest. I therefore proceed with pleasure to comply with a request you made of me before you left for Washington, to give you some information on the subject. The feeding of silk-worms began to attract attention in this region in 1838. Few, however, engaged in it. Mrs. D. that year fed a small number by way of amusement, which succeeded so well that we were induced to continue it. In 1839 we fed

about ten thousand worms, and although (from necessity) we kept them in a small, close, and badly ventilated room, they were throughout perfectly healthy, wound off well, and made very fine cocoons, weighing about 275 to the pound. Encouraged by this, and believing that the culture might be carried on successfully here, become a valuable branch of our agriculture, and bring into requisition a large portion of our fine timbered lands, I determined to proceed with it; and in the spring of 1840 commenced the erection of a building suited to the purpose, which I have since finished. That spring I had a large crop (or family, as the French writers would perhaps more correctly call it) hatch out, but, owing to the want of room for them, made only about 40 bushels of cocoons. This crop wound off in April. In the succeeding month of May I brought out another small crop, from some choice eggs sent me from the north, which turned out well. In June and July, I brought out another crop of about five thousand worms; these were the second crop of the small white two-crop worm, a very hardy and valuable variety; and although we fed them in the attic story of my new cocoonery, amidst the noise and dust occasioned by the carpenters and masons who were engaged in finishing it at the time, they were exceedingly healthy, and wound off in the month of August very handsomely. In 1841 we fed two crops of about 150,000 each; the first in March and April, and the latter, which consisted of the two-crop worm, in May and June, and made about one hundred bushels of cocoons. There being no ice-house in this neighborhood, we could not avail ourselves of the advantage of giving our eggs what is termed a "*temporary winter*." so as to cause them to hatch again that season, and were therefore compelled to forego further feeding until the ensuing spring; but during the month of March we brought out a crop of about 300,000, which worked off very handsomely in April and May, from which we made about seventy bushels of cocoons. Being too much engaged with professional pursuits to go north to procure reelers, or the necessary apparatus for reeling, and having no knowledge of that matter ourselves, except what we have derived from our experiments, and little time to devote to it, we have most of our cocoons, say about 200 bushels, yet on hand. We have, however, with such apparatus as we could procure here, which is by no means the best, reeled off enough to ascertain that our cocoons, which I think would not suffer by a comparison with any made elsewhere, will make very fine, strong, and excellent silk. To satisfy you more fully upon this point, I herewith enclose you a small sample reeled in my family, and saved a large quantity of eggs; but notwithstanding a large portion of the latter were of the small white two-crop worm above mentioned, they did not hatch out a second time—a circumstance for which I am unable to assign any reason, unless it was owing to a long continuance of hot dry weather, which some writers on the subject say will cause that result. An ice-house having been established in St. Augustine, I about the middle of July placed a small quantity of my eggs, assorted, in it, in order to test the fact whether giving them a "*temporary winter*" would cause them to hatch, and, being very much pressed with business, paid no further attention to them until about the middle of September, when I took them out and spread them on a shelf in my cocoonery, and in a few days they commenced hatching, and we fed them through the months of October and November; they also were healthy, and wound off well.

I used no artificial heat, and am satisfied, from my own experience, that

we can always feed here eight months in the year without it, and in favorable seasons nine months, during which time we can make four crops, provided we can manage our eggs so as to cause them to hatch out when we wish them to do so; and I see no reason why we may not. I am aware that different opinions are entertained on this subject; it is contended by some that retarding the hatching in the manner I have mentioned must necessarily injure the constitution of the worm. I do not think so. Providence seems in every other respect to have adapted it to the use of man; its want of locomotion is a remarkable instance of that adaptation. If it crawled about like other worms, we could do nothing with it; and I believe that it is also adapted to that use in the particular that I have mentioned; an opinion to which I am led by observations and experience. This opinion I know is at variance with that of some writers, and amongst others Mr. G. B. Smith, of Baltimore, whose opinions upon all questions connected with the silk culture are entitled to great weight. He says, "that the silk worm, when left to itself, exposed to the ordinary atmosphere, hatches out in the spring, exactly at the time the mulberry leaves open; that it is, therefore, '*an annual insect*,' and requires exactly twelve months to pass through the various stages of it existence;" that if, for example, a silk-worm is hatched on the first of May, 1840, the eggs that it would produce would naturally hatch on the first day of May, 1841. In this I think he is mistaken; and, with all due deference, there seems to me to be an inaccuracy between his premises, which are correct, and his conclusion, unless the mulberry leaves come out always exactly at the same period of the year, which is by no means the case in this latitude. I never laid by any eggs from silk-worms that hatched earlier than about the 10th of February, until last year; yet I have almost every winter had worms hatch out whenever the temperature of the atmosphere was as high as 70°, in the following December and January, which is often the case here. Again, in consequence of cool weather at the same period of the year when the worms were hatched, from which they were produced, the hatching has been retarded; indeed, that is the case now. Many of the worms that produced the eggs I now have on hand were hatched before the 10th of February of last year; yet they have not hatched—owing, doubtless, to a backward spring, and by keeping my eggs in a cool place. I have also retarded their hatching beyond the period of the year at which the worms that produced them were hatched, without any prejudicial effect, so far as I could discover, upon the worm. But the Persians, it is said, possess a variety which produces eight successive crops in the year; and if I am not wrong in relation to the theory above mentioned, it will be a desideratum to introduce this species in Florida, where it will find a congenial climate. I observe that at a silk convention held in the fall of 1843, at Northampton, Massachusetts, Mr. Samuel Whitmarsh, whose experience in the silk culture is well known, stated that he was satisfied that but one crop could be made in the year in New England; and the principal reason assigned by him why more could not be raised, was, that the mulberry tree would not afford suitable food a longer period than was necessary for one crop. I use the leaf of the morus multicaulis, and that affords good forage for silk-worms here *at least eight months*, and sometimes nine, and even ten months in the year.

The advantage that I anticipated for Florida from the silk culture, in relation to our pine barren lands, (as they are called,) will doubtless be re-

alized; for although the trees raised upon those lands do not produce so large leaves as those raised on the rich hammock lands, yet they afford a better food, and the silk made by the worms fed upon them is stronger and of a finer texture. By the by, I am happy to learn that the experiment of cultivating sugar upon the pine lands in the interior also succeeds well. The cane raised upon them, although not so large as those grown upon the swamp lands, contains much more saccharine matter to the gallon. There is a great saving of labor, therefore, in handling and transporting it to the mill, and in grinding it. The same result as to silk culture upon the pine lands has attended the effort in Georgia. A writer in the last "Georgian," speaking of the experiments made there, says: "that pine lands are suitable for the production of the best qualities of silk." I now consider it as determined, and the fact to be of great importance to the neighboring counties, and especially to Savannah. If the pine country in our rear, which has been regarded as little more than waste lands, can be made productive, and subsist a dense population, what would now seem the most visionary calculations of such a change to Savannah and the country at large would *fall short* of the *reality*. But I venture to predict such a change, and that whoever may live to see thirty years hence will see "*lower country Georgia silk*" quoted in the prices current of Liverpool and Havre. I certainly agree with this writer; and what will be true of Georgia will also be true of Florida; and those who live at that day will also see "Florida silk" quoted in the same prices current; but while East Florida may compete with Georgia and States further north in the cultivation of silk, and that, too, with superior advantages, she will produce several staples in the cultivation of which they cannot compete with her, amongst the more important of which will be that of sugar. And now that the din of war has ceased, and the overflowing scourge that has so long devastated this fair portion of Florida has passed by, we may hope soon to see the country settled by an industrious, intelligent, and enterprising people. There is no portion of our country (or perhaps any other) that offers greater inducements to the emigration of that class of people than East Florida.

I have visited almost every portion of the United States, and spent many years in the noble valley of the Mississippi, (which might with propriety be called the "garden of the world,") while the country there was new, and I can say with confidence that I have seen no country where *industry*, *enterprise*, and *economy* usually met with a better reward than in East Florida. A catalogue of the crops suited to the soil and climate, and of the spontaneous vegetable productions, would embrace almost everything found at the north, with the addition of many others of exceeding value, not found in colder latitudes. Amongst the last are the orange, and almost every other tropical fruit; and as to the healthiness of the climate, it is too well established to require any comment. Some portions of the army, to be sure, suffered much from disease during the late Indian hostilities; but I am told that an examination of its statistics will show that it suffered less from that cause in Florida, in proportion to numbers, than it did in the northern and northwestern frontier during the last war with England.

The temperature is a pleasant medium, between the extremes of heat and cold. By a register of the weather, kept for two years at Charlotte Harbor, the mercury never stood but once as high as 90°, nor sunk but once as low as 50°. Further north the extremes are somewhat greater; but at St. Augustine the mercury seldom rises above 90°, or falls below 30°. But, to use the language

of a writer in a late number of that valuable work, "The Journal of the American Institute," there are other considerations of high import to the enterprising agriculturist, in favor of locating in East Florida. It has been satisfactorily proved by the late indefatigable and much to be lamented Doctor Perrine, that almost any article grown between the tropics will flourish as well, and in some cases better than in their native soil. And the entire catalogue of spices and other articles, for which we now make long and perilous voyages to the opposite side of the globe, often to unhealthy climates, and always incurring vast expense, can be grown in our own Territory, and furnished at a cheaper rate and in better order than those obtained of the half-civilized Asiatic islanders. In addition to all which, cattle, horses, and hogs may be raised in any numbers upon our fine grazing lands, with little or no attention from man. Our rivers and lakes abound with fish of the greatest variety and best quality; our wood-lands with the most valuable lumber. And it requires not, as in colder regions, the labor of one half of the year to provide for the other. When all these things are considered, in connexion with the fact that East Florida already produces three of the most valuable staples in the world—Sea island cotton, rice, and sugar—it will, I think, be readily acknowledged that few new countries, if any other, have ever offered advantages to emigrants superior to those now offered by East Florida. But I crave your pardon: you only asked me some account of my operations in the silk culture, and I have spun out what I fear will be a tedious article.

I am, sir, yours, &c.,

THOMAS DOUGLAS.

Hon. D. Levy.

From the Dollar Farmer.

SILK CULTURE.

Since the explosion of the morus multicaulis speculation, the silk business in Kentucky has not advanced with very rapid strides. Some of those persons who took hold of the business as a business, and investigated the subject properly, are now, by their careful, slow, and patient progress, demonstrating that the pursuit is both safe and profitable, and easily connected with other farming business.

Mr. John Cain, of Meade county, called on us the other day and made a statement of his experience in silk culture, the results of which are gratifying. He states, that on the 20th of April last he commenced feeding twenty thousand worms upon the foliage of the white or Italian mulberry, and, three weeks after, he commenced feeding upon the multicaulis. About half the worms were destroyed by the late frosts, and but two bushels of cocoons was the result, making two pounds of beautiful reeled silk. On the 20th of May he commenced feeding a second crop of twenty-five thousand worms entirely on multicaulis, and lost one third of them by mice and birds. Four bushels of cocoons was the result, three and a half bushels of which produced three and a half pounds of silk, and the remainder ten ounces of eggs. The third crop of twelve thousand worms he commenced feeding on the 26th of June, one-fourth of which died of the muscodine, a disease which he checked effectually by sprinkling cold water upon them. This remedy

deserves to be generally known. The result of this crop was two and a half bushels of cocoons, two bushels of which produced two and a quarter pounds of reeled silk—a better product, it will be seen, than the first crop. He fed the foliage of only one-quarter of an acre of trees, planted in 1840 and 1841, and he did all the work himself alone. He gives the pecuniary result as follows:

7¾ pounds reeled silk, sold at $5 - - - -	$38 75
4 ounces eggs, at $12 (market price) - - -	48 00
Total - - - - - -	86 75

Mr. Cain states, that besides attending to the silk-worms he attended to his other farming business about as well as his neighbors, and raised, among other things, twenty acres of oats, which produced three hundred bushels, worth at least fifteen cents per bushel; making forty-five dollars. The twenty acres of oats thus produced forty-one dollars and seventy-five cents less than the half acre of mulberries. He further says that it would take him four days or more with his team to haul his crop of oats to market, while he could take his crop of silk, of greater value, under his arm, without difficulty, and walk with it. The twenty acres devoted to oats constituted the very best portion of his farm, and the half acre devoted to mulberries is the very poorest. Mr. C. says that the season has been very unfavorable for the silk business, and that generally a better result may be relied upon. Mr. Cain used a log building, thatched, but he thinks that open sheds are preferable, and he is now erecting one seventy feet long for next season's operations. Nothing is so injurious to the worms as confined air. His worms have always done as well on the Italian mulberry as on the multicaulis. He cuts the twigs, but does not pluck the leaves, as by this means the tree is kept down to its convenient stature and form, sustains no injury, and a much larger amount of foliage can be gathered in a given time; thinks it better to gather them after the dew begins to fall; and thinks that his success depends very materially on the fact that he has used eggs which produced the Chinese *peanut cocoons*. Though he has saved no more eggs than he wants for his own use next year, (as he means to feed four acres,) he is willing to part with a few thousand eggs, a thousand in a place, for the purpose of aiding in the introduction of an improved stock in the country. They can now be forwarded by mail, and we are authorized to say that orders addressed to him, post paid, at Brandenburg, Kentucky, enclosing twenty cents for a thousand eggs, will be attended to.

Mr. C. says he has lost many eggs by keeping them in ice, but has been entirely successful in keeping them under ground in a saltpetre cave which he has. It would perhaps do as well to have them in a glass jar, well sealed with wax, so as entirely to exclude moisture, and placed in an excavation some six or eight feet deep in the bottom of an ordinary cellar, where water can be excluded, or even suspended in a deep well.

If we add that Mr. C. has found it advantageous to change his worms occasionally, when feeding, from one place to another, we have probably given all that is at all peculiar in his management, and all the principal points which can be of value to those who have read the popular treatises upon the subject.

Of course no sensible man would propose to make the silk business take

the place of all other branches of husbandry. But it no doubt deserves a place among other branches. It is simple, and can be carried on successfully by women, children, and the aged and crippled. But little land is required, and the poorest appears to be as well adapted to this culture as the best. A man having a few acres of poor worn-out land in our mountain counties, with a large family of children, could not do better than to occupy a portion of his soil with the mulberry. There is a certain market for all his cocoons and reeled silk in this city and elsewhere, and prices are far more uniform and fixed than those of almost any other article of produce. There is a demand at the silk factory in this city for more than can be produced for some time to come in this State. Raw silk is now imported from Europe in large quantities, to be manufactured in this country. Besides, the imports of manufactured silk amount to several millions. There is no danger that the business will be overdone. No teams are required, and there is no branch of farming that can be carried on with so little capital. Cuttings and roots of both the Italian mulberry and the multicaulis can now be procured for nothing, or next to nothing, and they can be cultivated and propagated as simply and certainly as the currant bush. It may be added that the perforated cocoons, not wanted by the manufacturer, can be carded and spun in the family, and constitute an important material of domestic clothing.

From the New York Farmer and Mechanic.

IMPORTANT FROM GEORGIA—SILK WELL-ROPES AND OX-CHAINS.

We regret that the small space necessarily devoted to this department obliges us to withhold from the public many valuable communications from practical silk culturists. We shall endeavor, however, to give the substance of all letters of importance designed for the public eye.

The following extracts are from our friend Judge Ernest, of Macon, Georgia. This gentleman has long been identified with the interests of this enterprise in the southern sections of the Union, and deserves the thanks of all for the perseverance he has manifested in prosecuting the business, in defiance of all opposition; and we can but hope that the fact is beginning to be realized, that silk may be produced at the south with far less expense, and greater profits, than any other crop. As in Georgia, so in every part of our country, people wait for a market, and nothing of importance will be accomplished until measures are matured and carried into operation for purchasing and reeling all the cocoons that can be produced. Since we have been agitating this question, we have been gratified to find our efforts seconded by the proprietors of various agricultural and other publications; and it is our intention to press the measure upon the attention of the public, until it secures the support its importance demands. Judge Ernest says:

"I consider your plan for a filature and market the most important step that has been taken in our country, designed for the advancement of the cause. There was more silk made in Georgia five or six years ago than there is now; and the reason is this: the people could do nothing with their silk (cocoons) after they had made it, and consequently abandoned the business. I have been offered several lots of cocoons for nothing, which

I have refused, because I had more of my own than I could dispose of, unless I have better means for manufacturing. Raw silk accumulated on my hands to such an extent, that I made a *well-rope of silk*, 40 feet long, and an *ox-rope*, bag-strings, &c.; and all because there was no market. I intend to make a favorable impression on the minds of people here in regard to the matter—shall make all the silk I can, turn it into cash, and tell them about it. I have accomplished much in this way already. If I find that there are going to be more cocoons than I can work up into sewing, I shall prepare to reel only. I told an acquaintance yesterday that I should purchase cocoons, and he promised to make all he could. He is a man calculated to carry anything he undertakes into effect. Several others also speak of going into the business. If I can raise a good crop again, I think the question will be settled in this neighborhood, and then it will go like fire in a prairie. I have always been successful, even when I knew less of the business, and had less inducements to prosecute it than I now have. I have 8 or 9 acres of trees, five years old, and room in abundance; so that my future prospects, compared with the past, are extremely flattering. I have done much under very unfavorable circumstances, and from this I infer what may be done under those more favorable. When I commenced the silk culture I knew nothing of the business, and in my isolated condition I had difficulties to encounter that persons in more favorable situations would hardly dream of. In addition to all the difficulties necessarily incident to the business, I was obliged to encounter at every step the opposition of almost every person with whom I was conversant. I am sure I have made the business profitable. We sell our silk to persons who could purchase at Macon, if it were for their interest to do so, and at prices to us satisfactory. Persons residing in Macon frequently purchase silk of us for their own use. I am confident that the United States must some day become one of the greatest silk producing countries in the world. It is impossible for countries where land is so costly as in Europe to compete with us in the production of silk, or anything else that grows out of the ground. It is a long time since I have heard any one express any doubts on these points. But when will you get a *market?* has been the question; a question which I have been unable to answer. If successful in accomplishing present plans, I can furnish a market until the business is too deeply rooted to be easily checked; and this I will certainly do.

"Designing no flattery, sir, allow me to say that I think you deserving the thanks of all the friends of silk culture throughout the entire country. It is very desirable to improve the condition of a solitary individual; but I am confident that you are in a fair way to benefit a great many persons. I do not pass a day without seeing some person whose condition might be improved by the silk culture. We have no bounty in this State, but we can get along without it. If we had a bounty, the business would make more rapid progress; but if it can get along without artificial means, it will always be more healthy and permanent. I have the satisfaction of knowing that although I have heretofore stood alone, or nearly so, the friends of the enterprise are now rapidly multiplying. I know it can be made more profitable than any present pursuit here. I would rather raise silk, than cotton at 20 cents (and it brings only 4 cents) per pound. Our people hang to their old habits, but this cannot be done much longer. If they see me making more money at the silk, they will want to have a hand in it."

From another letter, dated March 11th, we extract the following. It

will be seen from this that Judge E. has this season adopted the system of open feeding, and we predict an increased return for the same amount of labor heretofore bestowed. Indeed, this is certain. Will not Georgians now take hold of the business? A market is secured to them, and every circumstance seems inviting. While we are shivering with almost January weather, (March 20,) they have the breath of our summer, their eggs are hatching, and their foliage fine and abundant. While we, in many cases, are confined to one or two crops in a season, they can feed from April to November.

V. E.

Under the latter date, (March 11,) the writer says:

"I have some fears that our mulberry leaves will get killed, and that we shall lose our worms, for they are already hatching, and have been for several days. We are doing all we can to retard them, but shall not be able to do so much longer unless the weather changes. This is one of the most forward springs I ever saw. I have some mulberry trees in my yard which are now a fine shade. The leaves are abundant, and almost as large as my hand. The plum trees and blackberry bushes are all green, and stock is doing pretty well in the woods. These things are rather alarming, but we hope for good. I have one cocoonery 20 by 30 feet, two stories high; another 18 by 34. To these I am attaching sheds 16 feet wide. I leave the lower stories open. The only thing necessary to success, that I lack, is an ice-house for the preservation of my eggs.

"P. S.—The weather has changed for the better. It is cold enough to freeze if it were not cloudy, and our worms have ceased hatching."

From the New York Farmer and Mechanic.

SILK CULTURE—ADDITIONAL PARTICULARS.

We have more than once referred to the efforts making by Judge Ernest, of Macon, Georgia. Too much credit cannot be given this gentleman for his perseverance in this cause; and we rejoice to learn that his every effort is crowned with success. His feeding this season commenced about the middle of May. In a letter bearing date May 23d, he says:

"I have not made much silk this year: nevertheless, think I have made a favorable impression upon the minds of the people, because I have been completely successful with what silk worms I had. I have fed this year, for the first time, in an open building, and am well satisfied that silk worms do much better when fed in this way. I had no more eggs than I should have hatched and fed; but heretofore I have made too much silk—more than I could manufacture; and fearing that I should not get machinery in time, and that the same would be the case, I have chosen to feed but few, and disposed of a good many eggs; and in attempting to retard the hatching of some, I raised four or five ounces. We have made, we think, thirty pounds of silk, and have already reeled seventeen or eighteen pounds. I have heard of only one person who got eggs of me, and he has been successful, and will continue to raise cocoons if I would buy them, and that he was a man calculated to carry the thing to perfection; but, un-

fortunately, some of his domestics came across the eggs, and, thinking them of no value, threw them into the fire. He will go on next year. I also mentioned that Dr. Winn, of Monroe county, had a fine field of mulberries of twelve acres. The Doctor has been feeding silk worms for several years; and, to my great astonishment, has been unsuccessful. I was the more astonished because he had great zeal, and appeared pleased with the business. I could not account for his lack of success until last week, when I received from his brother an account of his management. He had fed all the time in a close garret. This solved the mystery at once, and I sent him word that if he would come and see me, I would instruct him to feed worms successfully, and he has promised to do so; so that I think there is little doubt but he will go into the business again; and if he does, and follows my directions, he will *certainly* succeed; and he can carry it to any extent, for he is rich, and, I understand, would delight in it. I informed you also, I think, that Major Smith had a fine field of mulberry trees, and that he has been endeavoring for several years to get some person to make silk for him; but at the time I wrote, I had been told that he had cut down his trees, and planted the field in corn. This, however, was a mistake. He had cut down his trees because they had got out of the reach of his stock, and he still wishes to get some person to attend to the business for him. The silk business will, sooner or later, be carried to a great extent in Georgia, but how long it will be before this time arrives, I cannot tell. Great numbers are already convinced that it can be made more profitable than anything we are doing, and yet few seem determined to go into it. This is strange, but it is certainly true. Ex Governor McDonald is a great friend to the silk cause. He is a great jurist, and his business and knowledge extend all over the State; and from him I expect to gain much information of the business in different sections of the State. I labor under many disadvantages, being alone. Were there others, we could have an ice-house, which a single individual can hardly afford; hence I must confine myself to a single crop. I have had eggs sent from the north, but they did not do well. If I have too many eggs, they are lost; and if too few, there is no one to supply me. With all these disadvantages, I make the business profitable. It is painful to think what great benefit might result to the country from the silk culture, and then see how little attention the subject receives. If people differed with me, I should neither wonder at them nor blame them; but they do not. Admitting the practicability and the importance of embarking in the enterprise, they leave it.

"We have, however, a few practical men among us; and during my feeding this year, I have had many visitors, and all seemed pleased with the business. One man came eighty miles, another thirty, and a third more than twenty; and they were moved by something more than mere curiosity, too.

"A poor lady in this neighborhood has made some cocoons, and, to her great astonishment and joy, I gave her \$2 50 per bushel for them; and I have already paid her \$10. She is much delighted, and says she will brag about and show her dimes to every body. The effect will be good. She could not have made half this at any thing else—and this she knows. There are many such poor families amongst us, and if they can be persuaded to go and do likewise, it will be well for both themselves and the country. I should not be surprised if there were cocoons enough raised

within reach of me next year to keep two or three reels in operation all summer, or perhaps all the year."

"A correspondent" furnishes us with another "good return." He says:

"A person purchased of me a few silk-worms' eggs, for fifty cents. They hatched July 4th, and in four weeks wound their cocoons, of a very superior quality, measuring five pecks, which weighed thirteen pounds to the bushel. He sold one bushel for $4, and used the residue for eggs, which are worth $5 or $6. He is so pleased that he intends enlarging his business—will procure more trees, and try again. He is an industrious farmer, has a family of children, and says that, for the time required, he can earn more than in any other way. His accommodations for feeding are very humble—an open shed or hovel—yet he has found success. Let others try."

A letter from Mr. John M. Sumner, of Wareheim, Pennsylvania, informs us that his success has been equal to last year, (150 bushels, we think,) and he is still feeding. Further particulars when through.

Such are a few of the favorable results which have come to our knowledge—all conducted with *reason;* and hence followed with success, as all such efforts must be.

We are informed by a note from the editor of the "Alphadelphia Tocsin," that their association will commence their arrangements next spring for making the silk business a regular and permanent pursuit, and that they have every convenience for making it extensive and profitable. We would refer similar associations to the German society, at Economy, to show to what extent it may be carried, where not less than 500 to 600 pounds of reeled silk have been produced in a single season; and this they manufacture into the finest and most beautiful fabrics—thus rendering it not merely an ornamental, but one of the most lucrative pursuits of the community.

Now that there can be no longer a doubt as to the *feasibility* and *profit* of the silk business, how long will men refuse, as many do, to embark in it, for no other reason than that it was *once* connected with speculation and humbugging?

A. C. VAN EPPS.

"STROLL AMONG THE MULBERRY TREES IN NORTHAMPTON, IN AUGUST AND SEPTEMBER, 1845."

In the midst was a spacious cocoonery, filled with an interesting family of silk-worms, of every size and age, between the egg and cocoon, taking a hasty *lunch* at the hands of the attendants, who estimated them at *one million.* Although the family was so numerous, each appeared perfectly satisfied with the fare from the larder and the field, furnished by only two attendants, to collect, prepare, and distribute the food to this numerous and interesting family: such was the order, regularity, and system adopted, that the whole process was as regular as clock work.

After passing through and inspecting the premises, a second stroll was made, in another section of the town, into an extensive *Canton mulberry* grove, which had grown the present season from three to seven feet, loaded with luxuriant foliage, sufficient for another million of worms, and was

introduced to another interesting family of *youngsters*, not of so numerous or of so large a size as some in the *millionary*, yet, as a whole, quite as interesting to behold, for they were in the last ovarious stage; and some had commenced their lunch, soon as liberated from the shell, upon the *mulberry paper* whereon they had been placed, instead of fresh foliage from the tree. It was a pleasing sight to see how readily they would pass from the common paper, on which they were hatched, to the mulberry paper. This paper had been made of mulberry foliage and bark, unbleached, for the purpose now used, and appeared to answer the purpose for which it was designed.

If this late experiment should prove successful, cocoons may be exported about the time that the New England silk convention shall hold their annual meeting, on the first day of October, 1845; but, should the weather prove adverse, a delay might extend to the time of the *national silk convention* on the 9th of October, or even later.

Another experimental crop has been in contemplation for matriculation upon the *new mode*, about the 10th or 15th of September, and, if not prostrated by General Frost making an attack upon the mulberry patch, may be expected to go up about that season of the year when Guy Fawkes laid his powder plot, on the memorable 5th of November, or some part of the month so fatal to English hypochondriacs.

I have witnessed the incipient, middle, and closing stages of feeding silkworms, and the great abundance of Canton foliage that could not or had not been used for feeding worms the present season, but which might and ought to be used for making mulberry paper, which is decidedly preferable for the steel pen, and also for the deposite of silk-worms' eggs, and for young worms when liable to premature hatching, or to obviate the destruction of foliage by frosts, in which case it is thought that the *dried leaves* might be used to finish with, being pulverized, moistened, and sprinkled with wheat or rice flour. Worms *have been* so fed with good success in the spring season. A large quantity of surplus foliage will be preserved for useful purposes, and also thousands of cuttings and eggs.

It is desirable to see the *finale* of cocoonery operations; therefore a stroll was made to an eggery—a place where silk-worms' eggs are saved for future use—and I had the pleasure of seeing a grand display of sheet after sheet, suspended and covered with silk-worms' eggs, for removal to the reception room; such were the quantities exhibited, as appeared sufficient to *wormulate* the whole of New England, and a surplus for the sunny latitudes, for which northern eggs are peculiarly adapted.

Some were deposited on large thick sheets, to absorb any possible moisture—others on very thin, pliable sheets, for mail convenience. But the most interesting sight was where the eggs had been deposited upon sheets of paper made of mulberry foliage, that, should the worms be hatched prematurely, they would have a mulberry substance to nibble upon, being prepared for that purpose.

It was interesting to witness how readily the young worms, soon as hatched upon common paper placed over the mulberry paper, would attach themselves to the latter.

The experiments now in progress may be of some benefit to new beginners, who may be supplied gratuitously with cuttings to commence operations another year, if taken away before November. A good supply will be preserved for sale.

Veritas.

For the Farmer and Mechanic.

A CHAPTER FOR SILK-GROWERS.

No business can be prosecuted with profit without a well-regulated system of operations. This is pre-eminently important in the production of *silk*—nothing can be done without it.

We have seen farmers with from one to three hundred acres of the finest land in the world, whose annual returns from the same were barely sufficient to meet the demands of the *tax gatherer*, and provide a comfortable subsistence for their families. We have seen in the same vicinity men with two-thirds less, and of precisely the same quality, not only meeting all the demands of the world upon them, and securing means for the support and education of their families, but yearly to add materially to the stock of funds accumulating for a "rainy day." Now, why this difference?

The reason is obvious: one conducts his operations with neither system nor intelligence, while the other employs both.

The same difference is observable in the culture of silk. We have been particularly convinced of this in preparing the matter for the forthcoming reports of the silk convention held at the American Institute in October last. Many cases are related where the writers had plantations varying from five to ten and twelve acres of mulberry trees, from which they had secured scarcely cocoons enough to pay for the cultivation of the soil. The failures in such cases are usually attributed to the kind of mulberry used. Others, with the same varieties and similar climate and soil, state that from one and a half to three acres they have realized from fifty to over one hundred bushels of good cocoons. These lavish their praises upon the same mulberry which the others condemned. The facts in the cases were, probably, that the trees of the former were entirely neglected, or indifferently cultivated, producing small innutritious foliage, while the latter had their trees planted on good soil, free from grass and weeds of all kinds, (which are exceedingly poisonous to the foliage of the mulberry,) and kept in a good state of cultivation during the season.

The first step towards success in the silk culture is a supply of perfect eggs; that is, eggs from healthy worms, properly taken care of at the time of laying, and secured in ice until needed for feeding. The care of the miller we shall refer to at the appropriate season. The saving of the eggs is a subject of immense importance, and has called forth various and conflicting opinions; some contending that the hatching process cannot be retarded without serious injury to if not the destruction of the worm, while others maintain that the constitution of the worm is not in the least affected by it. We concur in the latter theory, and believe it accords with the opinions commonly entertained by silk culturists of the present day.

In many instances persons have lost their eggs by placing them in an ice house; hence the lingering prejudices against this course. These failures have been owing to one of the following reasons, viz: Either they were not placed in the ice until they had passed through the incipient process of hatching, or else they were not sufficiently imbedded in the ice as wholly to exclude the warmth of the spring and summer atmosphere.

It is an easy matter, when filling your ice-cellars, to prepare a place for the box or trunk containing your eggs. A hole should be left near the middle of the cellar large enough to allow the box to sit in, and leave a space of a few inches on each side. This hole should extend down at least four feet.

Your box, having been placed in the bottom, should be covered and surrounded with straw. In taking out the eggs during the summer, it should always be done in the coolest part of the day, and the box never removed from the ice.

When the eggs are placed in the box, they should be folded up in several packages, and well surrounded with cotton batting. In this way we have kept our eggs until August, and found them perfectly dry and fine, hatching in about twelve days after their exposure. N. B—The eggs should always be placed in the cellar before the first of March. The safer and better way would be to get your ice in the latter part of January, and put your eggs in when the weather is extremely cold. On removing them for feeding, they should be gradually exposed; not permitted to receive all the whole warmth of the atmosphere before the third day.

The second thing in importance is, the mulberry plantation from which you are to collect your foliage. Many failures doubtless are to be attributed directly to the want of good, healthy foliage. The trees should be planted in rows, far enough apart to admit of easy cultivation. The ground should be kept perfectly free from all foul weeds, and as loose as possible. It should be among the last fall labor to throw up a furrow towards the roots of the trees; and in the spring return it as early as possible, that the roots may receive the benefits of the first warm rays of the sun.

Provided with eggs and foliage, we must next provide a place for feeding. The simplest protection that can be provided, to shield from sun and storms, will be found the best; and we should advise every person to adopt, without delay, the open system of feeding. A shed of the following description will answer every purpose, far better than any enclosed building that could be constructed:

For three acres of trees it will probably be found necessary to raise a tent or shed seventy-five feet in length, by twenty in width. The cheapest building of this description we have seen was made by placing in the ground three rows of posts the desired length—the outer rows eight feet above ground, the middle thirteen—and covered with common boards. The sides and ends were made of coarse muslin curtains, each about ten feet long, attached to rollers, so that the entire building could in a few minutes be exposed to as pure and free a circulation of air as in the open field. In one end of this tent should be finished off a nursery room, for hatching and bringing forward young worms, and also a bed room for the principal feeder. In this can be used Gill's ventilating cradle, or any other apparatus for feeding desired.

The nursery should be furnished with a stove for raising the temperature in damp, cold weather. Artificial heat may frequently be employed to advantage (particularly in New England) previous to the third moulting, while the worms require but little space and air.

We would here caution growers against noise. Every preparation requiring pounding or jarring should be attended to before the worms are hatched, that every thing in and around the building may be perfectly quiet throughout the whole feeding.

The feeding frames which we use, and prefer to any other fixtures we have seen, are very simple, combining all the advantages of "Gill's ventilating cradle," with none of its disadvantages, saving much time and some expense in their construction, besides being a sure defence against mice, rats, ants, and other enemies of the silk-worm. Should any of our read-

ers be disposed to adopt our plans, the following description will be sufficient:

In the first place, attach the pieces of timber designed for suspending the frames to the rafters, allowing them to come down to within two feet of the ground. These should be about seven or eight feet apart at the top, and four or five at the bottom, which will cause the frame to enlarge in nearly the same proportion with the worms, and thus prevent their becoming too much crowded. This is the chief excellence, we think, of Gill's cradle. Cross pieces should be fastened at the lower ends of the upright timbers, on which to lay boards to receive the worms from the nursery. About two inches above these boards should be placed sticks, one inch square, resting on pieces running lengthwise at the sides. These, at first, should be six inches apart, (after a few days' feeding, one-half can be drawn out;) and in feeding, the branches should be laid between them, until they are filled up to the top, when they should be laid across. After two or three days' feeding, the boards and dry branches should be removed from under the worms, and they left to feed on the branches above. If care is taken to feed no more than is needed, the brush will remain very open, allowing all the pieces of leaves and the excrements from the worms to fall directly through to the ground, from which they should be often swept out, furnishing a free circulation of air from beneath. At the sides and ends of these frames it is necessary to have something to keep the branches in order, and prevent the worms from falling off. These may be made of narrow boards or laths; between these and the brush most of the cocoons will be placed, as it secures the worms from the light, and furnishes them with places for fastening their floss, whenever they have finished eating and are ready to spin. These directions, of course, are applicable only where *branch feeding* is practised. Cocoons should not be gathered until dried; that is, in six or seven days from the time the worms begin to spin. Those designed for eggs should be selected first, taking such as have been spun by the most healthy worms. These should be closely flossed and spread out thin on the shelves in the nursery.

We now come to the destruction of the chrysales, and the curing of the cocoons, upon which the value of the silk must depend. We cannot dwell upon this point with too much care. We have received at our filature cocoons that had been almost ruined by the means used for stifling the chrysales. Our standing offer is from $2 50 to $3 50 per bushel; yet we have had cocoons sent us which would not pay the expenses of reeling and transportation. Among the means resorted to for this purpose *alcohol* is doubtless *the best*, as it not only destroys the chrysalis, but leaves the fibre of the cocoon in fine order for reeling, and is supposed by some actually to add to its original beauty. Not more than a half pint (some use only a gill, others a pint) is needed for a bushel of cocoons. They should be placed for this purpose in a tight box; first a layer of cocoons, (very thin,) then a slight sprinkling with alcohol, and so on till the box is filled, which should then be nailed up tight. After remaining in the box about twenty-four hours, they should be removed and spread out for drying, which will take several days, even in very warm weather. If the chrysales are not entirely dry, they undergo a putrefaction, which frequently injures the silk, and renders them very offensive to the reeler. Persons designing to send their cocoons to our filature are requested to adopt the above method; and as soon as dried the cocoons should be forwarded, as it is exceedingly hazardous pur-

chasing when they have been lying some months, and become very dry. Applications are now pending for several hundred bushels, and we know not what to answer. We can only say to all, as we have said to some: send your cocoons if you please; we will do the best we can by them, and pay you all we possibly can afford.

In conclusion, we would say, persevere, and success is certain. The silk cause has never been half so flourishing as at the present time. We will, as we have before said, pay all we can for your old cocoons, and warrant you a good price for your coming crops, be they large or small.

A. C. V. E.

THE SILK CAUSE IN THE OHIO VALLEY.

We believe it is not generally known to what extent the culture of silk is carried on here. It has had no "multicaulis mania" to interrupt its progress, and hence has gone steadily forward until the present time. Farmers along the Ohio have hit upon the true principle—the one by which we gain our supplies of butter, cheese, lard, &c., &c.; that is, each producing a small quantity at least. In passing through that beautiful valley during their delightful summers, it is becoming quite a common thing to see the females and the smaller members of the family gathering the foliage, and carefully bringing forward a family of silk-worms. It is found profitable, either on a small scale or an extensive scale; and we have been told that more can be made from a given quantity of land, in raising cocoons at $2 per bushel, than wheat at $1. The same is doubtless true of the entire South. If we are correctly informed, there is not less than 50,000 bushels of cocoons now annually raised in the valley of the Ohio. Should we name any course as more likely to succeed than any other, it would be that of Mr. Bliss, in his report to the Ohio legislature. He recommends every farmer to have his patch of mulberry, and every year to make it a point to raise at least ten bushels of cocoons. This will most certainly be the practice when filatures for reeling are established.

A. C. V. E.

MULBERRY TREES, SILK-WORMS, &c.

Messrs. Fleet & Starr: There are many species of the mulberry, but the Alpine is to be preferred to any other, and was very highly valued by Mr. Whitmarsh, who imported it.

The mulberry leaves are composed of five distinct or different substances—the solid or fibrous, the coloring matter, water, saccharine, and resinous substances. The fibrous, the coloring matter, and the water, excepting a very small quantity, cannot be said to be nutritive to the silk-worm. It is the saccharine matter which nourishes the insect; that enlarges and forms its animal substance, separating itself gradually from the leaf, and, attracted by the animal organization, accumulates, clears itself of all that is foreign to its own nature, and by degrees fills the two reservoirs or silk vessels which form the whole internal cavity of the silk-worm. Much depends upon the proportions which the different elements of which the leaves are composed

bear to each other. Cases may occur in which a large quantity and weight of leaves will minister very little serviceable nutriment to the silk-worm.

The Alpine mulberry, planted on high land, exposed to cold dry winds, and in light soil, produces the most healthy and nutrient leaf, and the largest quantity of strong silk of the purest and finest quality. The less nutrient substance the leaves contain, the greater quantity must the silk-worm consume to complete its development. The result is, that being obliged to perform an undue amount of labor in consuming a large bulk of innutritious foliage, the worms become fatigued, enfeebled, and certainly more liable to disease than those are which eat a smaller amount, which they would do if the leaves were more nutritious. The small silk-worm, or the eighth crop, is the best sort; this is a very superior species—it furnishes superior silk, and of a fine texture.

Cocoonery and mulberry plantation.—We have a mulberry plantation of 15 acres of trees, and a cocoonery on it, 100 feet by 25, and one plantation of 20 acres; cocoonery now in process of erection for feeding this season.

Reel, and reeling.—The greatest defect in American raw silk is, that it is badly reeled, owing to its having been done by awkward and inexperienced hands. Seeing the necessity of a public filature, to which all who grow cocoons could resort, we were induced, for the advantage of all, to establish a filatory of 8 reels, for the reeling of all cocoons which are good, and the chrysalis stifled by my method. My reel possesses many advantages over every other reel. I have made several improvements on the reel since I sold four to Mr. Van Epps. I make the reel larger for the skein to reel the silk on; have sold 12 of the reels to go to South America, and one to Canton, China. Mr. Valentine, an English silk manufacturer in this town, procured some of the silk reeled by me on this reel, (which he considered superior to any other which he has known, for evenness, color, and finish,) to send to his friends in England, as its success is improving the silk manufacture.

Northampton stands first upon the list among silk-growing and silk-manufacturing towns in America. The Northampton Association (silk factory, one hundred feet long and four stories high) promises to do much for the advancement of the silk business, as well as the prosperity of the town. They have succeeded in lustre, smoothness, and fineness of texture, not surpassed by the best Italian, as they have a French dyer. Very truly yours,

OLIVER D. PAINE.

NORTHAMPTON, *Mass.*

SILK CULTURE.

The following letter from S. A. Clemens, of North Granby, Connecticut, will be read with interest. It shows with what reception the improvements in feeding meet in our oldest establishments. This is the true plan, and must eventually be the only plan of rearing the silk-worm successfully. The old school system may and frequently does succeed, but is always attended with immense cost compared with the new, and shows that our climate is so well suited to the growth of the worm that it will grow under almost any circumstances. Mr. Clemens says:

"My grandfather planted on his farm a small orchard of the white mul-

berry, 50 or 60 years ago, from trees obtained from the minister of the parish, who raised them from seed furnished him by President Stiles, of Yale college. A few of these trees, as large as good sized apple trees, are now standing, and yield abundant foliage. Twelve or fifteen years ago my father planted an orchard of about three acres with white mulberry, in rows about one rod apart, and the trees three feet apart in the rows. The open ground between the rows having been cultivated each season, the trees have flourished vigorously, although the soil is of an indifferent quality. Silk-worms were fed from the old orchard some time previous to the last war, and the silk made into sewings, stockings, &c., in the family. During the last ten years, we have fed more or less, and always with good success in rearing the worms. We think there is no more difficulty in hatching a crop of silk worms, and carrying them through safely, if the requisite care is bestowed, than there is in raising poultry. The care chiefly necessary is, to keep the eggs in a cool dry place, secure from vermin, until they are wanted, then expose them to such heat as will bring out the *young artist;* feed him plentifully while he is disposed to eat; let him alone while he is moulting; and, above all, don't suffocate him by want of air. We have obtained the best cocoons from early feeding, and have attributed it to the foliage being fresh and better adapted to the nature of the worm than late in the season. Until the last year we had followed the old Connecticut custom of plucking the leaves from the trees for feeding, but the trees having grown so large that it was difficult to get at them for this purpose, and the tops having become so thick as to need pruning, we cut off the branches a few feet from the trunk, and stripped the foliage from them. Either of these methods, however, is unnecessarily expensive. We are now cutting out the tops of our trees, leaving the bare trunk and two or three feet of the principal branches, which are within reach from the ground, and intend, hereafter, to feed entirely from the young shoots, which will be furnished in abundance. As the shoots are taken off, others will put forth, and thus there will be a supply of fresh, tender foliage until late in the season. This seems to reform the apparent difficulty in making as good cocoons from late as from early feeding. From observations made at the cocoonery of the Northampton Association and elsewhere, we are convinced that the best mode of cultivating the mulberry is to plant them in rows about three feet and a half apart, and as thick as they can grow in the rows. The trees are kept headed down by cutting off the shoots several times in the season, as they spring from the ground. In this way the weeds are easily kept out with the cultivator; the foliage is obtained with little labor, and probably in greater quantities than if the trees were planted at greater distances, and permitted to form trunks. A neighbor of ours has cultivated the multicaulis in this way, and fed from them for several years with entire success. Instead of feeding with the shoots, however, he gathers the leaves as they put forth, and every spring cuts down the whole top to within a few inches of the ground. By spreading the litter from the hurdles upon the orchard, he has sensibly improved the condition of his soil, which was sandy and poor, and thus increased the quantity of foliage each year. The silk he produces is manufactured into sewings in his own family, and returns him at the rate of $100 per acre. Another neighbor, who cultivates the multicaulis with like success, fed from one tree one season, and found that, weight for weight, the white mulberry produced much more silk than the multicaulis. We have tried the different kinds of worms, and like the peanut best, as affording very fine,

strong silk, and perhaps equal in amount to any other variety. Some silk growers in this vicinity prefer the mammoth sulphur, as it reels more easily, and, although the silk is of a coarser quality, it answers very well for sewings. It is to be regretted that the fine lustrous silk which we can raise in this country should meet no better fate than to be made into sewing-silk, for which, abroad, only the third rate silk is used; but we are compelled to endure this until our people learn how to reel the splendid fabrics of our silk-worms in the way it deserves. The silk reel* invented by Mr. Oliver D. Payne, of Northampton, Mass., for compactness of construction, ease in joining the fibres, and the superior manner in which it leaves the skein for the hands of the manufacturers, I think superior to the Piedmontese, or any other reel I have seen, and well merits the examination of all who are interested in reeling. What I have penned [is first rate practically, and naturally worthy of imitation—V. E.] may be of less value to others than myself; but whatever may be the hesitancy now shown to engage in the silk business, I am convinced that branch feeding (in open sheds) is destined to insure its triumph; and certainly I know of no one who has had experience enough to give weight to his testimony, but will agree with me that silk culture can be made the most profitable branch of husbandry pursued in our country, cotton and sugar (of which I have had opportunity for demonstration, both at the south and West Indies) not excepted.

"Yours, very truly,

"S. A. CLEMENS."

THE SOUTH AND SOUTHWEST.

In making our proposed tour through these sections of the Union, we have concluded to begin with Mississippi, rather than at Economy, Pennsylvania. The view we shall give will be an imperfect one, and not calculated to give a full representation of what is being done here, from the fact that a great majority of those engaged in the silk culture have never reported themselves, either to the Silk Culture Convention or to private individuals. The first letter we shall present is the following, from Doctor Philips:

Log Hall, Edward's Depot, Miss.,
September 9, 1844.

Sir: Your address to "silk-growers, &c.," reached me a short time since through due course of mail. I now will endeavor to comply with your wishes.

The lady of my nearest neighbor, W. R. Gibbes, commenced last year to rear the silk-worm. Being of an experimental turn of mind, she resolved to try whether the trouble of feeding, fires, &c., &c., might not be avoidable; and, as her wont, no sooner said than done. She provided a covering to defend from rain, from birds, and to protect from the ant; this was done by the aid of an old worn out umbrella, and some netting of the kind we use

* We have this reel, with some improvements, in our filature, but have used it only a little; it contains some important principles—improvements, we think, on the old system of reeling. Our opinion in full shall be forthcoming hereafter. A. C. VAN EPPS.

for mosquito bars—coarse and torn. The worms were placed on a small multicaulis, and protected. I visited my friend several times whilst the worms were feeding, and know certainly that they were thus exposed to all weather, with no other protection, and that whilst they were there we had a very hard rain, with two exceedingly cold days for our latitude and the season—wind blowing constantly for two days, very keen, from the northwest. With all this, these worms, in a short time after the weather became pleasant, were larger than those kept in a house with a fire. This experiment of my sister-in-law proves most conclusively to my mind that worms will bear any degree of cold that we have in our climate at that season; and her spirit merits all commendation.

We feed a few worms, only to keep up *seed*, and, as usual, in an airy room, without cutting or being particular to have dry leaves—gathering with dew on them; we cleared our frames oftener than usual, using no lime, and were more successful than heretofore.

I send you specimens of our silk—not prepared with the most remote idea of sending from home, much less to *such* a spot, and to *such people.* You will make due allowance for our never having seen reeling or twisting; we have no machinery save that used on an ordinary plantation—a common *large wheel*, and a reel used for hanking thread. We use the thread we manufacture, either to make fishing-lines, or our ladies use it in their business, or to make lace for "edging" or "inserting." We find our thread far stronger, in proportion to size, than that we purchase of *foreign* make, and more even. Our machinery is too rude to offer them in competition with your northern articles, nor do I intend it; my intention being to give you something that will show the strength, and that my *adopted State* should be represented *badly* rather than not at all. The specimens sent you are—

A few cocoons of peanut variety—the first eggs presented us, as such, by Miss Emma Montgomery, of Oktibbeha county, Mississippi. These are from W. H. Benton;

A specimen of silk from those cocoons, 120 fibres to the thread, as it now is, reeled and twisted by Mrs. Wm. M. Wells and my daughter, from our cocoons;

A pair of mits—the work, from beginning to end, done by Mrs Whitford, a lady 50 years of age, and presented to Mrs. Philips. She is a very thoroughgoing lady at all improvements;

And, lastly, a fishing line made from unwrought silk, and left in the gum, thinking that the gum would keep it slightly stiff and elastic, as also less permeable to water.*

Respectfully,

M. W. PHILIPS.

James Tallmadge, Esq.

SILK BUSINESS AT THE WEST.

In the last No. we gave extracts from a communication of John W. Gill to the American Institute, in which the statement was made, that co-

*The several articles here enumerated were all received, and were admired by thousands of visitors at the last fair of the American Institute. They reflect the highest credit on the several ladies whose handiwork they are. May every success attend them.

V. E.

coons enough were made in the valley of the Ohio to keep 200 reels in constant operation during the year; from which we concluded that not less than 50,000 bushels of cocoons were annually produced. This conclusion was based on the following calculation: We suppose the reels to operate 300 days during the year, and to *turn off* 174 lbs. of silk per day, which would give 52,200 pounds per year. Allowing each pound of reeled silk to require 1½ bushel of cocoons, we have *fifty-eight thousand seven hundred and twenty five bushels of cocoons.* This calculation is a perfectly reasonable one, and will be found, by experience, to fall within the truth. We called the quantity 50,000 bushels, which we confess seems like *exaggeration*, but the source of our information is a reliable one, and the statement must be *set down* as *true*, until shown to be otherwise, for a proof of which our columns are *open.* Since the publication of the above, no little surprise has been manifested, and we have been met by numerous exclamations like the following: "Is it possible! 50,000 bushels of cocoons!!! What can possibly become of the silk? Is it exported, or are there *private* filatures and manufactories to consume this vast amount of silk?" We confess our *ignorance* of the *disposal* of the cocoons, or raw material. We have stated our authority and drawn our conclusions, and leave our readers to *investigate;* remarking that many inquiries have been forwarded to our filature from the west and southwest, asking for a market for cocoons. So far as we know, no distinct establishments have been opened there for reeling, and, judging from nearly 100 letters we have seen from silk culturists in those sections, we believe by far the largest proportion of these cocoons are worked up into sewings, &c., in the families of their producers. Owing to the imperfection of their machinery, a large proportion is worse than lost. Mr. Gill (whose factory is by far the largest at the west) says that he works up only 1,000 bushels per year. We hope shortly to be able to announce the establishment of filatures at different points along the Ohio and its main tributaries, of sufficient extent to reel every cocoon produced.

A small addition to our pecuniary facilities is only wanting to enable us to carry our plans into full and successful operation. Any gentleman disposed to aid in this way can learn particulars by calling at the American Institute and inquiring of its officers, who are acquainted with our plans, and who are quite as much interested in their success as we can be.

Among the innumerable benefits this institute is conferring upon the country should be named their exertions to advance the culture and manufacture of silk. We have been indebted to them for valuable counsels, and important facts. They have just placed at our disposal a large number of letters received at the last annual silk convention, held at the repository of the Institute in October last. These contain matter of vast importance connected with the experience of the last year, which, on many accounts, is the most important in our history connected with silk. It was the intention to have embodied these letters in a report, similar to the previous year, but this has not been done, and we shall commence next week the regular publication of them in the silk department of the "Farmer and Mechanic;" copies of which will be sent to silk-growers generally; and as this valuable journal is to be the regular depository for information on silk, and is the organ of the American Institute, containing the proceedings of the Farmers' Club, we hope every person receiving a copy of this will not only become a subscriber himself, but induce others, if possible, to do the

same. Mr. Fleet is the oldest agricultural editor in this State, and no other has such abundant facilities for the collection and diffusion of useful information. We shall next week commence a tour of examination in the Ohio valley; beginning near its rise, at the establishment of Miss Rapp, at Economy, Pennsylvania.

A. C. VAN EPPS.

SILK CONVENTION.

Reply of Dr. Daniel Stebbins, of Northampton, Massachusetts, to a circular of the American Institute, inviting his attendance at the convention of silk culturists, &c., held during the late Fair, dated Northampton, October 2d, and addressed to the secretary of the Institute. He says:

On account of the situation and public duties requiring my personal attention, it is extremely doubtful whether it will be admissible for me to accept of your kind circular invitation, and must be deprived of the pleasure of participating in the enjoyment of that interesting meeting. But I have done, and shall continue to do, all I can to advance the cause in some other way—to stimulate others to improve the opportunity. I have caused public notice of that convention to be extensively circulated in the papers, with the time and importance of the convention.

Perhaps in this way I shall have rendered as much personal service as could have been reasonably expected of a solitary individual.

I labored incessantly last winter to obtain the grant of a bounty from our legislature, to encourage the growth of silk in this Commonwealth; and through the aid of kind friends, a bounty of ten cents was obtained on cocoons for the term of three years.

I had hopes that the bounty would have excited an interest throughout the Commonwealth, to commence *anew* or *recommence* the business of growing silk. But my anticipations have been sadly disappointed. Various causes might be assigned: the previous and extensive destruction of trees, in consequence of the tree speculation, so that only a few trees escaped, and those in the hands of individuals who were not influenced by the delusive prospect of immediate wealth.

Another cause may have deterred others, who had some remaining trees on hand, the foliage of which was injured or destroyed by early spring frosts at the very time that farmers should be about their spring work, and could not wait for the reproduction of foliage; and there may have been other causes; but these alone were sufficient. Trees may be reproduced, and another spring frost may not occur next year. But we very well know that when any business has been long suspended from adverse causes, and other pursuits adopted, it is very difficult to persuade people to return to former occupations, unless by the strongest inducements of more immediate reward than can now be guarantied. As in every other great undertaking, we want the "long pull, strong pull, and pull altogether," and the same exertions in the silk culture.

The spring frosts did not materially injure the foliage of my trees, on account of the favorable location.

Although I have 10 to 12 acres of the best variety for growing silk, my

health and other business requirements prevent my personal attention to the business. The present year I leased to the Messrs. Clemens, of South Granby, Connecticut, who will attend the convention and relate their own story. There has been some silk reeled, and a large quantity of silk-worms' eggs left in my care for another year; and a plenty of good cuttings will be preserved.

Before the Messrs. Clemens closed their business, I had foliage sufficient to feed one million of worms. I have now in the care of another person 200,000 or 300,000 worms to test late feeding upon crude and frost-bitten foliage, for we have had severe frosts and sudden changes, with the mercury suddenly dropping from 60° or 70° down to 40°.

I have no confidence, however, in this *late crop*, and am confirmed in the opinion of an early crop being the most safe and sure, so as to close up the business as early as practicable in the month of July.

I am peculiarly favored with a location to keep my eggs, and have now on hand several ounces of last year's production, and there is no more appearance of hatching than at the time they were laid, more than a year since; and to test these, I have brought out 15,000 to 20,000, which hatch in 5 or 6 days, appear well, and, as the fishermen say, "*kicking*." They eat well, and I shall try the effects of unpropitious weather and crude foliage.

The crop of 200,000 or 300,000, hatched beginning of September, appear rather torpid on cold mornings, but, by the aid of moderate artificial heat the chills are removed, and they begin to eat late in the morning, and can take only three meals in the day. They have not yet had the *ague*, but I am daily expecting to find them *defunct*.

The silk statistics of Northampton, as taken this spring by a resolve of the legislature, are as follows—being furnished therewith by a person who took the list:

There are three silk manufactories, with a capital of $14,000. Ten males and forty-seven females employed.

75 to 100 lbs. of American silk, worth $500.

Over 6,000 lbs. of sewing-silk and twist manufactured, worth $41,500.

Immense quantity of silk-worm eggs raised for market by private individuals.

The weight of cocoons and quantity of reeled silk for 1845, not yet ascertained.

The New England silk convention convened the 1st instant, according to previous notice, to receive written communications, to be forwarded to New York; but none presented for that purpose. Delegates were appointed (one from each of the New England States) to attend personally, or appoint a substitute.

Since writing the above, I am notified of a public meeting, at 10 o'clock, a. m., on the 9th of October, of which I am secretary, and my services on that occasion and day cannot be dispensed with, as business of the whole county will come before the meeting. Therefore, please accept of my best wishes for success.

Very respectfully, yours,

D. STEBBINS.

Since writing the enclosed, I have received a letter from Mr. Chamberlain, of Lima, Peru, South America, who last autumn called on you for the report, not then out; he wishes to obtain one if practicable. He took out a

quantity of machinery; lost their ship, all his Canton trees, and peanut eggs; wishes me to send enough of *each* to get the variety. About this time hoped to get up his machines, and then inform me of the result of his enterprise. He had made some silk, &c., of which I think there were samples on the card I sent you last year.

His letter is dated Lima, May 24. Expects agent to come out, and can take any thing. Says there is quite an interest taken in raising silk in Lima; but most people are too timid to undertake a new business; that the climate is, above *all others*, fitted for the cultivation, and eventually will be as profitable as are her mines.

Mr. N. Storrs, a native of this place, has resided in Jamaica, with S. Whitmarsh, of Savannah, Georgia; is acquainted with the cultivation of mulberry trees; do not know that he ever fed worms in Jamaica, and south.

D. S.

We would call the attention of northern feeders particularly to the subject of winter and spring frosts, which have proved so disastrous, and blasted the prospects of so many, who, in a more propitious latitude, might have exceeded their own desires. We must take measures to secure the roots of our trees during the severity of winter, and retard our eggs beyond the season of spring frosts. The months of June, July, and August may be relied upon. A hardier variety of mulberry than the multicaulis might be adopted to advantage: say the white mulberry grafted, a nursery of which may be seen at 337 Broadway, owned and for sale by L. P. Finniels, by whom they were imported from the Cevenes mountains, in France. The statement was made several times, in the course of the Fair, that the United States produced, last year, 397,000 lbs. of silk! or about 400,000 bushels of cocoons. The *fact* must be very far from this. We very much doubt whether the aggregate would exceed, or even reach, 20,000 bushels. Where is the proof?—Editor.

SILK—LETTER FROM DR. STEBBINS.

Owing to the crowded state of our columns, we defer matter intended for the present number, and give only the substance of a communication from Dr. Stebbins, when we should have been pleased to publish it entire. His ideas on all questions relating to *silk* are practical to an uncommon degree, and we shall hope to find in him a regular and permanent contributor to this department. We know that his counsels in this cause are cheerfully given, and assure him they are highly appreciated, while we proffer to him, at all times, a space for the expression of his views. His letter, from which we now extract, may be resolved into the following brief conclusions:

1. During the ruthless destruction of mulberry trees, following in the wake of the excitement, he has been steadily cultivating them with great care and attention, presuming that they must be wanting, at no distant day, to replace those destroyed; and he has now ten or twelve acres of the best varieties of trees, with which he has been experimenting, to show up the practicability and utility of the silk culture.

2. He concludes, from his experience, that, in New England, the *one open* and *early* crop system is the most safe.

3. That the early foliage may be used for feeding, the after foliage for paper, and the inner fibrous bark from the stalks (which should be headed down annually, in order to produce large leaves) for cloth, or a quality of paper peculiarly adapted for lithographs and bank bills.

4. They suffer for want of skilful operators to carry out the plans decided to be the best.

5. He has preserved, for the present season, to accommodate new beginners, some thousands of young Cantons and Asiatic trees and cuttings, and eggs from selected cocoons. Among the older trees are seed-bearing Cantons, Asiatics, and Alpines.

6. The friends of the silk culture in Massachusetts have presented petitions to their legislature, praying for a bounty for the encouragement of the business in that State; and *he* has, with others, addressed members of the Senate and House of Representatives of the United States for the same object, but, "economy and prudence in expenditures being the order of the day," has little hope of encouragement to a branch of industry every way calculated to increase the productiveness and contribute to the independence of our country. (How much better would be the effect upon the country, and how much more it would savor of wisdom and Bible principles, to appropriate the money of the people, now employed in preparing ships of war, creating fortifications, purchasing ammunition, and "paying off" the navy, &c., for the encouragement of the production of silk.)

Dr. S. concludes by remarking that there are in the town of Northampton three silk factories, numerous plantations of mulberry trees, and the only thing needed is a supply of enterprising young men to conduct their feeding, and open establishments for the exclusive business of *reeling;* and adds, as a finale, some remarks in praise and for the encouragement of the New York Farmer and Mechanic—all of which are duly appreciated. Hope his measures for giving "a good circulation" among silk-growers, and other of our New England neighbors, may prove successful.

V. E.

SILK CONVENTION.

Mr. E. S. Bartholomew, of Portland, Chatauque county, New York, under date October 2d, in anticipation of the convention, says:

"I learn by the last No. of the Cultivator that a silk convention is to be held in connexion with the approaching anniversary of the *American Institute.* It would be highly gratifying to me to meet with you on that occasion, and participate with the friends of *home industry* in their deliberations upon this great and important national enterprise—the growth and manufacture of silk. I am a silk-grower, and it affords me great pleasure to see institutions of so high standing and character devoting a portion of their time to collect and disseminate information upon subjects of direct interest to the nation.

"I commenced the growing and manufacturing of silk in 1844. In the spring of 1843, a gentleman having a nursery of the Italian mulberry, wishing to eradicate them, gave them to me. I transplanted them—7,000

in all. In the spring of 1844, I put out an acre of multicaulis, and, on the last of May, commenced feeding. I raised 58 pounds of cocoons, which, after deducting one bushel for eggs, yielded me 6 lbs. 1 oz. of reeled silk: this I made into sewings, for which I found a ready sale.

"This season I have grown 150 lbs. 14 ounces of cocoons. First crop weighed 12 lbs. 8 ounces to the bushel; never have seen larger ones.

"Before commencing, I obtained one of the reports of the silk convention of 1843, and read carefully all the letters detailing the experience of the many who corresponded with the convention of that year. I came to the conclusion that the nearer I approached *dame nature* in the treatment of the worm, the better. Following up this conclusion, I erected me a cocoonery 20 by 24 feet, with large doors covering the entire sides, hung on hinges at their upper edge, so as to swing outwardly and form an awning. I leave these open all the time while feeding, and close only when cold and rainy; have ventilators to use at such times, and a stove to maintain a uniform temperature. I feed from seven to fourteen times per day. My rules are, the more air the better, strict cleanliness, and abundance of room. By observing these rules, do not lose 10 per cent. I now have machinery in operation for making sewings. I am satisfied that the multicaulis and early feeding will be attended with success. I am of the opinion that very many destroy most of their worms by allowing their eggs to become moist in the ice-house, or place of keeping; they should invariably be kept dry and cool. I keep mine in a tin box perforated in the top for the admission of air; this I place within a tea-chest, with the lead in, which also prevents moisture, and place them in a cavity in my cellar. If the worms could be fed all at a time, early, they would do much better, and make more silk at less expense. I use the earth for my floor, and, in case of too great heat, irrigate with water.

"The drought and intense heat of the present season have caused much disease in many parts. For several days in succession the heat continued intense, with little or no circulation of air, and the worms died by hundreds. I tried the experiment of a cold water bath, and found it to answer a good purpose. I sprinkled it on them gently with a small corn broom. I am satisfied that cold water is not detrimental, either as a bath or on foliage, if not applied too often. I shall continue to enlarge my operations and form a market for cocoons—which I shall prepare for market in raw silk. I can grow and reel ready for market at $1 56 per pound. Reeling is perfectly simple and easy, as well as all the modus operandi of the silk culture. Many in this neighborhood have entered into the business and failed. Tight feeding, and only twice a day: why not?"

REMARKS.

It is with great pleasure and satisfaction we give the results of this gentleman's *introductory movements.* He has reviewed the experience of the past, and turned it to a most profitable account. His experiment, it is true, has been on a small scale; but what he has done in this, he can proportionally equal when extended to any number of acres; and we repeat what we have often said—no branch of business can possibly be undertaken with greater certainty of success than the production of cocoons, *all things considered.* It may be introduced in Maine and Vermont, "Texas and Oregon," and almost every other section of this continent; and that, too, with profit. The difference is in favor of the warmer sections, but only in

the length of time which may be devoted to it; for silk, like wool, becomes coarser as we approach the equator, and *vice versa.* Mr. B. refers, in his letter, to the experiment of some of his neighbors and their failures, adding as the cause, "close feeding, and twice a day." "Why not?" he may well say. The *fact* that they produced a single cocoon is evidence that the silk-worm faithfully performs her task, and only needs *natural facilities* to enable her to perform it *well.* In conducting this business, we shall always observe the same difference which is observable in other pursuits. One farmer, for instance, will be highly successful in every movement upon his land; another, with precisely the same soil, naturally, and the same facilities for rendering it productive, will scarcely create a subsistence for his family. On visiting these farmers, we find the former, with his laborers, gathering *alluvials* from the *lowlands* of his farm, which he is industriously depositing over its entire surface, *while* untold quantities of the most enriching substances lie undisturbed on that of the latter; while *he* goes on from year to year adhering to the old routine of *ploughing*, sowing, and consuming. So in the culture of silk. One feeder hatches his eggs and feeds his worms through, in about the same time that would be required for the worm to pass through all his changes, in a state of nature; while another, in the same neighborhood, will pursue a course which *prolongs* the existence of the worm to twice its natural length. The result of the former treatment is a *full-sized, healthy* worm, and a *firm, heavy* cocoon. In the latter, precisely the reverse—a *small, feeble* worm, and a cocoon scarcely worth the reeling. Should we make a personal inspection of the operations of these men, we should find, in the former instance, a well cultivated orchard, a thoroughly ventilated cocoonery, and the worms supplied *regularly, both day and night*, with good nutritious foliage, and as often, at longest, as once in three hours. In the latter, we should probably find an orchard which had been a stranger to the plough or hoe, it may be for years; the cocoonery a confined "*garret* or *bed-room*," and the worms supplied with foliage poisoned by the influence of grass and weeds, at the same hours that the *feeder* takes his own food. Instances of this kind are constantly coming before us. We now recollect one directly in proof of our statements. During the present season we furnished one man with eggs, which in due time hatched and commenced feeding; we *then* supplied another individual with eggs of the same lot. The difference in hatching was about two weeks. The former of these had to bring his leaves over half a mile, and would bring at once sufficient for several feedings, and keep them wet and cool. To preserve their freshness, the latter took his leaves directly from the tree, and supplied as often as once in two or three hours. The result was, the latter completed his feeding in twenty-six days from hatching, and about as much in *advance* of the former as he had "*the start*" *of him* in the commencement. It is in consequence of these differences that we receive at our *filature* such a variety of cocoons. Two lots were brought us, not long since, produced from the same variety of worm, and fed from the same variety of mulberry; the one full-sized and perfect, yielding 20 ounces of silk per bushel, while the other required double the number to make a bushel, and gave not more than 14 ounces of silk—the fibre scarcely exceeding in strength the spider's web. The causes of the difference were precisely what we have named.

Equal variety exists in curing the cocoons and transporting them, to which we shall hereafter allude. We wish particularly to call attention

to Mr. B.'s cocoonery. The plan is a capital one. We have used canvass for the sides and ends. His arrangement we think preferable; it shields more perfectly from cold, and, as he says, forms an awning in hot weather. These things all come into account at the north: at the south they are not needed.

We shall ere long present a review of the proceedings of the National Convention of Farmers, Gardeners, and Silk Culturists, so far as they relate to silk, and exhibit the present aspect of the silk cause, as represented in that convention.

A. C. VAN EPPS.

New York Filature, 19 Stanton St.,
November 10, 1845.

LETTER FROM MR. J. W. CHAPPELL, OF LIVINGSTON COUNTY: ANOTHER YEAR OF SUCCESS.

What farmer of Livingston county can show a better return from a like number of acres?

Lima, Livingston Co., N. Y., *November* 29, 1845.

Dear Sir: Our crop of cocoons the past season amounted to about 700 pounds, produced from less than four acres of land. They were raised at three crops. The first hatched the 8th of June, and spun their cocoons the 13th of July. The second crop spun the 18th of August. The third crop did not finish spinning until the 9th of October. This last crop was the best crop of the three. A fire was kept in the cocoonery most of the time during the feeding of the last crop, keeping the temperature at about 70° Fahrenheit. Our worms are fed from five to eight times a day, being careful to feed fresh and *tender* leaves to the young worms, and *mature* leaves to those that have passed their third and fourth moulting. Our worms are cleaned every day, from the morning they hatch to the day they commence spinning.

We use the multicaulis mulberry exclusively for feeding, and consider it as hardy a tree as any variety in this country. Our plantation consists of about 200,000 of these trees, planted on high and dry land. Nothing has been done to protect them during our severe winters, and I am not aware that we have lost, during the seven years that we have had them in cultivation, a single tree.

We have reeled most of our cocoons, and have now on hand (and for sale) about 70 pounds of excellent raw silk, and have 20 or 30 pounds yet to reel.

It is expected that the bounty, which is about to expire, will be renewed at the next session of our legislature. Let the State grant a bounty for the term of ten years, to continue five years at 15 cents per pound for cocoons, and 50 cents on reeled silk, and the next five years reduced to 10 cents on cocoons and 30 cents on reeled silk, and it cannot fail to cause the permanent establishment of this business in our country. A large number of persons in this section of country are awaiting the action of the legislature upon this subject before they shall engage in the business.

Yours, &c.,
JAMES W. CHAPPELL.

A. C. Van Epps, Esq.

NEW YORK FILATURE, 19 STANTON ST.,
December 10, 1845.

DEAR SIR: Yours of the 29th ultimo came duly to hand. I learn with much gratification of your continued success in a branch of business which, I verily believe, must eventually become one of the most important in our country. Your success is the legitimate result of a steady perseverance and determination to triumph, which few have manifested. I regret that so large a proportion of those who have embarked in this enterprise have done so through merely speculative motives, with little real interest in the work, and no fixed determination to test it fairly, and prosecute it to complete success. I have, during an experience of many years as an instructor, held up to my students the *great motto*, "What man *has* done man *may do*," and so would I say as respects the production of silk in the United States.

What France, Italy, or any other country, *has* done, America *may do.* If Italy can produce silk to the value of $40,000,000 annually, it would be a libel upon American skill and ingenuity to say we cannot do the same, and as far surpass as our natural *facilities*, such as climate, soil, &c., surpass hers. This we can do; and, with enough to follow your own example, we shall do in less than a quarter of a century. You have learned through the public prints that the subject of silk has occupied the attention of the Farmers' Club of the American Institute, at its last two sessions. These meetings are to me a source of decided interest, and I doubt not their beneficial influence will be extensively felt. It is a most fortunate thing for our country that there is in this metropolis an association like this, to collect and disseminate all the important facts in relation to the agricultural and mechanical world. The subject of bounties on silk has been duly considered, and a committee appointed for the purpose reported at our last meeting the form of a memorial to the legislature, asking a continuance of our present bounty. Energetic action on the part of those interested in this business, in securing a large number of signatures, will probably secure our object. I think a petition so evidently in accordance with the public interest cannot be refused by our representatives. The subject of the mulberry was under consideration at our last meeting, as you will see by our reported proceedings. It was contended by some that a variety of the mulberry more hardy than the morus multicaulis must be adopted in our northern States. The late extensive destruction of this tree would seem to demand this. I have repeatedly recommended it, but I am not prepared to go to the expense, and exclude the multicaulis *altogether*. I should suggest the propriety of substituting for the *name* morus multicaulis that of the *Chinese mulberry*, which is its *real name*. I believe a lingering prejudice against this tree has much to do with the extensive denunciations we meet with. Your own abundant success, and that of others much farther north, prove the entire safety and practicability of using the foliage of the *Chinese mulberry* in feeding our worms.

I contend that it is perfectly safe on high and dry land, in any section of the United States; but it cannot endure one winter where the water is allowed to remain about the roots. My opinion on the subject of the mulberry has been repeatedly solicited by persons about to engage in the culture of silk; and I take this occasion to give expression to my views more fully than I did when the subject was before our club. I repeat, this is undoubtedly the Chinese mulberry; and the disciples of Confucius very

properly attribute the prosperity and solidity of an empire hitherto without parallel to the benefits derived from this tree. It was first introduced—as was the Broussa, another valuable variety of the mulberry, which ranks next to the Chinese in the quantity of foliage it produces, and which is considered much hardier, and in this respect has the advantage—through the agency of the American Institute, in 1828, about 10 years after its discovery by M. Perollet in the garden of a Chinese cultivator at the city of Manilla, capital of the Philippine islands. This distinguished botanist was sent out by the government of France on a voyage of research to the seas of Asia in the year 1818, and returned in 1821, bringing with him, besides 158 other species of living plants, what he termed the multicaulis—many stalked, or mulberry with many stems—and which he termed, by way of eminence, the Chinese mulberry. It originated in the elevated regions of China, and always prefers and flourishes most luxuriantly on similar locations. It was thence rapidly disseminated over all the plains near the seashore. From Canton, it was introduced into Manilla and all the islands of the Asiatic Archipelago, so general was the belief in its superiority over all others then employed. The reception of this tree was alike flattering. In less than two years from the introduction of the first tree into the United States, millions of money were invested in it. Silk companies were formed in almost every city and village in the land, and many of them with immense capitals. Extensive cocooneries were erected, with little or no adaptation to the end in view. Under this excitement, trees were multiplied with incredible rapidity, until the country was literally inundated. The "mulberry fever," as it was termed, saw its day, and then came on a reaction. Thousands of flourishing nurseries were torn up and burnt, and in a few months nearly all were destroyed. So great had become the prejudice against the multicaulis, that it was next to impossible to convince a man who had been "bit" that it possessed any value, or that it was fit for any thing but to be burnt. Had the trees left in the country by this excitement been carefully husbanded, we should now have been ten years farther advanced. Instead of this, we are raising but little more silk now than at the commencement of the revolutionary war.

I am of the opinion that three quarters of all the cocoons now raised are the product of the Chinese mulberry. Clark, in his work on the mulberry tree, claims for it the following advantages, as compared with the white, viz:

1st. It is full as hardy as the white.

2d. One pound of its leaves contain as much nutritive matter as a pound and a half of the white.

3d. The silk made from it is of a finer texture, and more lustrous.

4th. Its leaves are so large that a pound can be gathered at half the expense and trouble that a pound of white mulberry leaves require.

5th. It can be cultivated with infinitely greater despatch than any other kind.

I fully concur with him in the 4th and 5th, but think he may be mistaken in the other respects for which he claims superiority.

The principal advantages to which this tree is justly entitled, are, the abundance of foliage it yields the first year, and the exceeding ease and cheapness with which it may be gathered. The difference in favor of this, in my view, when compared with any other I have seen, is as five to one; besides, it is so well adapted to the system of *green feeding* now being adopted. I am told that the Broussa is as easily propagated from cuttings,

yields as abundantly and as good a leaf, and, besides, will endure our winters where the Chinese will not. If such be the case, then I think we may well give it our attention. The advocates of the Canton claim the same advantages for that. I am disposed to attribute the varied results of the experiments that have been made more to the place and manner of feeding, after all, than to the variety of the mulberry used. In no other way can I account for the *difference*, under similar circumstances. These differences must soon disappear under the modern improvements now entering into the culture of silk, and, with the same forethought as other business, meet with a like success. We must not depend upon other nations for an article so extensively used amongst us, and which we are so well calculated to create ourselves.

I know many instances where arrangements are making to enter into this business, both at the north and south, and believe we shall ere long proclaim to the world our independence of all nations, not only for the necessaries but the luxuries of life.

I am, sir, very truly yours,

A. C. VAN EPPS.

JAMES W. CHAPPELL.

CLAIRMONT MULBERRY NURSERY, &c.

FRIEND W. H. STARR: The paper thee publishes, entitled the "New York Farmer and Mechanic," which thee has been so good as to send me, has been received, and is, I think, calculated to do much good, especially in advancing two of the most important pursuits now being established in our country.

In reading the paper, I was pleased and interested by the very extensive information collected and published on the silk business; showing the immense expense incurred by the British government in bringing the same to its present very profitable standing. Their silk goods are now the admiration of the world, nothwithstanding they are unable to produce the raw material for want of a congeniality of climate.

With a little experience, the production of cocoons in our climate is as simple and easily accomplished as that of wool or flax. Filatures are indispensable, and will require time for their permanent establishment. The reeling of silk would afford pleasing employment for the females of our country.

As nurseryman, in the years 1837, '38, and 39, I raised and sold of the white mulberry trees and cuttings to the amount of $15,374. I raised, during the same time, considerable quantities of cocoons of first-rate quality, notwithstanding our inexperience. I should have continued the business but for the want of a filature where to dispose of my cocoons. Silk-reeling must be a distinct branch of the business. I understand that there are such estalishments in New England. I trust to see our stores, at no distant day, filled with fabrics of domestic make, so rich and good as to render us independent of all foreign nations, giving pleasant and profitable employment to various classes of our population.

ROBERT SINCLAIR.

CLAIRMONT NURSERY, NEAR BALTIMORE,
First month 11*th*, 1846.

REMARKS.

It is to be regretted that persons possessing the facilities and practical skill of Mr. Sinclair should, in the infancy of the enterprise, be obliged, from any cause, to vacate the field; but more especially is it to be lamented at this particular crisis, when the ranks of the silk culturists are so broken, and the cause struggling for existence.

In a previous communication, Mr. Sinclair describes his establishment and operations as follows, which we insert for the information of any who may turn their attention to this very favorable opening for prosecuting the silk culture; which advanced age disqualifies the proprietor from further attending to. We understand that Mr. S. would be glad to negotiate with some person qualified for the business, and would offer favorable terms. We extract as follows:

"I have a large stock of multicaulis and other mulberry trees, and a house, 42 by 30 feet, two stories high—both stories and garret well shelved, with a suitable cellar to preserve and cut the leaves in.

"In 1841, I had 83 bushels of cocoons raised in it—sulphur and peanut—mostly the former. In 1842, I let the house and trees to a person on shares, who made about 16 pounds of reeled silk, and upwards of 100 ounces of peanut eggs. The present season I managed it mostly myself; but, owing to many other engagements, I made only one crop, amounting to 34 bushels of peanut cocoons, which was as many as the house would hold at one time. To regulate the temperature, I have a small tight room in the cellar, with a stove in it, which enables the manager to warm the house by means of suitable conductors to convey the heated air into the different parts; but I find, in our climate, this trouble and expense may be avoided, by commencing about the first of the 6th month, after the chilly, damp weather is past. My glass windows are in one frame, and hinged so as to open or shut as the weather requires; and also Venetian shutters, so constructed that each slat, working on its own pivot, can instantly be changed from the broad side to its edge only to the light, admitting or excluding light and air, and heat—which I find very convenient. I prefer the peanut and multicaulis to feed with. I think the white Italian equally good, but the tedious gathering is a serious objection. I think it best to cut the leaves very fine until after their second moulting; then, to save time and expense, feed with branches. When ready to spin, it is best to remove them to clean shelves, and feed them plentifully with leaves. If cut, it will be better; all which will prevent their becoming *sickly*, and spinning in their own *dirt*. This is the period in which most failures occur, and may be easily prevented by a little extra attention for about a week, and the profit and success much depends upon it. At the second moulting, I have observed that only one-half or two thirds moult the first day, and the balance the next day. I find it much the best, and saves trouble afterwards, to keep these separate.

"P. S.—I found but little difficulty in raising good silk the first season, without any previous experience, and it may be raised to good profit, if manufacturers will continue to give four dollars per bushel for good cocoons; and it is well suited for families consisting of some women and children. I apprehend much wealth will ultimately come out of raising silk."

Mr. Sinclair says the business would have been continued, had there been

a market. This is but one of many instances of the abandonment of this business, when it had been most favorably introduced, on account of the same difficulty. We are happy to inform all such that there is now in operation in this city a filature for silk reeling, where cocoons are purchased at fair prices. Silk-growers would do well to avail themselves of its advantages, as their cocoons, if cured and carefully put up in barrels, may be sent a considerable distance. A large crop of last year has been forwarded from the south of Georgia. This establishment is at 19 Stanton street.

SILK IN TURKEY.

The original manufactories of silk were established before the conquest of Constantinople, at Broussa, from whence most of the raw silk is still obtained, the abundance of mulberry trees in its neighborhood being favorable to the nurture of the silk-worm. Little Broussa silk is, however, now sold in the silk bazar of Constantinople. Within the last ten or fifteen years, since the several treaties made with the Sublime Porte, the home silk trade has diminished fifty per cent. A large supply of imitation goods is received from England, France, and Italy, and the richer articles, principally manufactured at Lyons, have completely superseded those formerly received from Broussa, or manufactured at Scutari and Constantinople.—*White's Three Years in Constantinople.*

From the New York Farmer and Mechanic.

A REAL CURIOSITY—NURSERY OF MULBERRY ON BROADWAY.

This consists of five hundred grafted white mulberry trees, imported from the Severn mountains—the home of the Huguenots—in the south of France, by Mr. L. P. Finniels, of 337 Broadway. This gentleman came to the United States for the purpose of embarking permanently in the silk business, on the system of his own country. He has brought with him the best variety of trees—far superior to any heretofore introduced into this country. They are grafted about five and a half feet from the root, and shoots have grown from them from three to six feet since the last of May, and are covered with a most luxuriant foliage. He has fed a few worms, and secured a number of excellent cocoons. The multicaulis, and other varieties, frequently answer a good purpose. The silk business is a safe one with them; but a better variety, and a better cultivation of them, have much to do with the future progress and triumph of the silk business. These trees are now offered for sale, at a price little exceeding their actual cost to the importer. We advise silk-growers in attendance at the fair of the American Institute to call and examine, and bespeak for them a cordial reception, and valuable suggestions by the proprietor. Persons in the country who may wish to secure any number of these trees can have them sent safely and promptly in any direction. We shall esteem it a pleasure to aid in their distribution. Price $1 each.

From the New York Tribune.

AMERICAN SILK.

Mr. Jeffrey Hutchinson, a farmer of Long Island, well esteemed here, is now visiting our city with specimens of sewing-silk, reeled and manufactured by his daughters from cocoons produced on his farm from the morus multicaulis. We bespeak for him the favorable regard of all who consider how vastly important it is, in a national point of view, that our people should learn to grow and manufacture their own silk. It will require skill and patience to effect this, with some patriotic sympathy on the part of the wealthy and discerning; but the silk culture will ultimately be established and flourish here. Mr. Hutchinson's appears to be an excellent article, which all who want sewing-silk will do well to buy for their own sakes. He will submit it to the judgment of our principal citizens.

For the New York Farmer and Mechanic.

SILK.

Dear Sir: Although I have of late witnessed much that is interesting to me in this fertile region of country, (might be called the garden of the east,) I shall only state a few leading facts, from which you may possibly judge of what is being done along the valley of the Connecticut. Omitting, however, to say anything of the vast fields of broom corn, that make so good a return for money and labor expended, I will just remark that the silk interest, which has for so long a time received attention from some of the more enterprising and intelligent part of the community in this region, is not by any means dead—only resteth—soon to start with a double certainty of success, promising as sure a profit to the grower as anything he can raise. There are now two manufactories of sewing-silk and twist in this place, one of which I had time to visit only; and another being built, and to commence operations in the spring. Most of the silk used is imported in the raw state, as cocoons enough cannot be obtained of American growth. Sewing-silk and twist from the factory of Messrs. Holland & Conant is pronounced, by the tailors and merchants of Boston, to be equal to the best Italian, and is preferred by some, and is under contract for three years. This speaks volumes in favor of Yankee enterprise. Mr. Holland has a very simple silk reel for family use, with a traverse motion for the spooling—is easily kept in order, and costs only about five dollars. It is the best and cheapest I have seen. He also makes a silk spinner for five dollars per spindle. For family use, generally, put three spindles; it operates well and easy, and is of the same principle of those in use in his factory.

I find that orders are continually being received for mulberry seed and eggs to go south. I believe it is a well authenticated fact that eggs from the north are much the most sure in a southern climate. Mr. Whitmant, of Cuba, has his from New England, and there is likely to be a demand for them in South America. There is an abundance of trees in this section, and good opportunities for young men who would like to commence the business. Mulberry orchards to be let on shares, or sold, as will best suit.

From the New York Farmer and Mechanic.

LETTER FROM SAMUEL BARRETT, ESQ., OF FRENCH CREEK, VIRGINIA.

In detailing his experience of the last season, Mr. Barrett expresses great confidence in the silk business—considering it an enterprise of great national moment and individual advantage. He has not done much the present year; but this little has increased his confidence in, and more fully assured him of the entire practicability and ultimate success of, the whole enterprise. He has been gradually multiplying his trees for years, with a view of entering largely into the culture when they shall have arrived at maturity.

He further says: "Living at a great distance from any silk-grower, I have found it extremely difficult to obtain eggs. I have for a year or two been much retarded on this account. The past season I placed my eggs in an ice-house in March, after a considerable warm weather, and feared, in consequence, they might be injured. I exposed about half an ounce of these on the 8th of May.

"The foliage had then become quite large and abundant. On the 16th we had a severe frost, which killed all the foliage, except here and there a leaf which had been concealed by the grass. On the night of the 24th we were visited by a second frost, cutting off what had started since the 16th. Again, on the 31st, another quite as severe as either of the others. I still kept my worms alive on a few frost-bitten leaves, but they did not spin, or but few of them, although they did not appear to be diseased.

"I exposed another crop of eggs June 23d—one ounce. They hatched in 14 days. During the 1st, 2d, and 3d ages, many of them died. The remainder appeared healthy, and wound superior cocoons in 28 days. The variety the "Mirabel Inanes," I fed five times a day, and exposed them freely to fresh air. The heat was a part of the time intense. They made me 40 pounds of cocoons, weighing 250 to the pound. The mortality among my worms I attributed to a *natural imperfection* (?) of the egg, or injury sustained by placing them in ice after the hatching process had commenced. Good attention and thorough ventilation alone saved *any*. I have this season tried an experiment—the raising of the multicaulis from the buds. About the middle of May, I planted a small patch of ground with multicaulis branches, which had been buried during the winter in the open field. When I planted them some of the buds had grown an inch, so that, in handling, hundreds of them broke off. Small fibres of roots had started opposite each bud. I prepared and furrowed my ground, making the furrows two feet apart, and laying in the branches without vacancy throughout the whole length of the furrow, laying at least two branches side by side. They came up directly and grew most luxuriantly, notwithstanding it was extremely dry. The frost killed all up at the 1st of June. Wishing to ascertain how many leaves I could gather from the *patch*, I have just gathered them from one row; I found them to weigh 30 pounds, which being a fair average, the forty rows (saved from the frost) would produce 1,240 pounds of leaves. Fifty pounds are allowed to subsist 1,000 worms. According to this calculation, the forty rows would feed 25,000 worms, which should produce at least 6 pounds of reeled silk, and possibly 8 pounds. I measured the ground carefully, there being 30 square rods. At this rate I could produce from one acre 6,613 lbs. of leaves, and feed 132,000 worms; giving 33 pounds of reeled silk, worth $165, or

at $5 per pound. This is the product of one acre of multicaulis of the first year's growth from the buds. The land on which they were planted was thin, and had been but slightly manured the last year for corn.

"I once almost doubted the statement of Rev. Mr. Lane, that he had obtained 2,200 pounds of leaves from a quarter of an acre. I no longer doubt its correctness. I have in all about two acres of trees, consisting of Cantons and multicaulis. Half of them are from two to three years old. They occupy land which would produce 20 or 25 bushels of corn to the acre, and I can now gather at least 4 tons of leaves."

REMARKS.

The failure of Mr. Barrett is but *one* of many from the same cause. These disastrous *frosts* extended over the entire south. Southern silk-growers generally have depended upon a *single* crop, from the fact that they could not preserve their eggs. In Georgia, the silk-worms had just commenced feeding, when their food was totally destroyed, and many thriving plantations of trees, which afterwards yielded an abundant crop of good foliage sufficient to have made hundreds of bushels of cocoons, were entirely unemployed. Had it been known in time that the *dried foliage* of the mulberry, when moistened and sprinkled with rice flour, would answer a *good purpose*, and that eggs could safely be sent from the north during any part of the season, and were *preferable* to those saved at the south, the crops on feed at the time the frosts occurred might have been saved, and all the after-foliage turned to *silk*.

The suggestion made by Dr. Stebbins, of feeding worms from dried leaves, we deem practicable; and we advise feeders generally to preserve foliage in this way, that they may be prepared to meet emergencies which have proved so extensive and disastrous during the present year. A gentleman who has recently made a tour through Europe informed us, a few days since, that when in Switzerland he found the inhabitants prosperously engaged in feeding silk-worms from *dried foliage*, brought from mulberry-growing countries. He represented the worms as appearing finer and making superior cocoons. We should also advise persons at the south engaged in the silk business to secure their eggs during the fall and winter previous, that all their foliage may be employed. Orders for dried foliage, mulberry trees, or cuttings, and silk-worms' eggs, will be promptly attended to by the subscriber.

A. C. VAN EPPS.

From the National Intelligencer.

SILK CULTURE IN THE UNITED STATES.

Messrs. Gales & Seaton: In your European correspondent's letter of August 20, published in the Intelligencer of September 13, I find the following paragraph:

"In the Journal des Debats of the 12th instant there is a column of American statistics derived from the last report of your Commissioner of Patents. Towards the end, it is said that the culture of the mulberry and the raising of the silk-worm have utterly and ruinously failed in the United

States. 'Let France,' it is added, 'cease to fear American competition: the Union will be for her an immense market.' We may hope that the silk case is not so forlorn with you. What are the *natural* obstacles to perseverance and success?"

I assume the duty of answering the very interesting interrogatory at the close of this paragraph. There are *no natural* obstacles to *perseverance*, much less to *success*, in the silk business in the United States. The obstacles to its progress at present are purely artificial and *ephemeral.* I have had my eye upon this subject now *twenty-one* years. That I might be a disinterested witness even in the public opinion, I have kept myself clear of any pecuniary interest in the culture of silk. I have witnessed its progress, its experiments, its successes, and its failures; have scrutinized all the details of each and all; and have never yet found the slightest reason to doubt its ultimate successful establishment as one of our main staple productions.

The reason of its apparent depression at this time is to be found in the very place where it should be most rationally looked for. The late speculation in mulberry trees, called the multicaulis speculation, which I never failed to oppose, and which I never in the slightest degree advanced, caused expectations of profits from the silk business that were not only unreasonable, but wildly extravagant. The failure to realize these expectations by the many that began the culture of silk, and although a *reasonable* profit was at hand, induced its abandonment by thousands. They expected to realize a thousand dollars from an investment of capital and labor that in any other agricultural employment would have been satisfactorily compensated by fifty or a hundred. Disappointed in this extravagant expectation, they abandoned the enterprise. Another obstacle was found to its progress in the go-ahead character of our people, and their want of foresight. They raised large quantities of cocoons before there were means provided for their conversion into any useful article, and had not patience to preserve them till these means were provided. This was a great error, and placed one of the most insurmountable obstacles in the way of our progress.

Let everybody understand that the late multicaulis speculation had nothing to do with our capability to produce silk; that the true friends of the silk culture were always opposed to that speculation, and did all they could to restrain and suppress it, (the writer of this among them,) but that it had the effect of proving conclusively that the United States, from 32 to 44 degrees of north latitude, (longitude without limit,) is well adapted to the silk culture, equal in climate to China, superior to China in the enterprise, industry, and intelligence of our people, and superior to France or even Italy in every requisite for the successful culture of silk. *I* may not live to see it, but the time is not far off when even France shall be supplied with silk from this country—all Europe of course. The germ of this great interest is already firmly imbedded in our physical condition, and nothing can arrest its steady progress to an overwhelming extent. The time will come when even cotton will be second to silk on the list of our staple productions. But, before all this can happen, our people will have to learn to be satisfied with moderate but remunerative profits, and to gather these in particles so small that the common or unpractised eye would scarcely discern them. They must also learn to make up large results from small items. Did it never occur to you, Messrs. Editors, that the great difference between our

northern and southern people consists in this particular feature—they of the north are satisfied in collecting large sums from the congregation of extremely small items, almost ultimate atoms; while they of the south can never contemplate with composure anything less than a crop of a thousand bales of cotton, that is to yield them twenty to thirty thousand dollars? Even these latter, *with big eyes*, can only see a large *cotton field* of one hundred to a thousand acres; the individual plant itself is too small for their vision. They forget that it is only from the aggregation of the products of these individual plants that their hundreds of thousands of bales are made up. Now, silk is a peculiarly small article—small, I mean, in physical proportions; but there is no article so well adaped to aggregation into large masses of value.

Please say all this to your much respected correspondent in Paris. Tell him that the self-complacency of the Journal des Debats is misplaced, and bid that Journal and the people of France, and those of Italy with them, beware of "American competition" in the production of silk.

Respectfully,

GIDEON B. SMITH.

BALTIMORE, *September* 13, 1845.

From the New York Farmer and Mechanic.

DR. STEBBINS AND NORTHAMPTON.

We are pained to learn that our friend, Dr. Stebbins, has been confined to his room for more than a month past with serious indisposition. A letter from him, dated the 8th instant, states that he is so far convalescent as to resume correspondence; and, as a matter of course, his first word is about silk. We are fearful, when we consider his advance in life, and the great mental as well as physical activity which has ever characterized him, that he will fall before the great work to which he has devoted himself shall have been accomplished. But we hope that some satisfactory evidences may appear that his labors have not been in vain, and that his works will follow him. From the letter above alluded to we extract as follows:

"Some two years since, the Rev. Mr. Perkins, with bishop Mar Yohannan, from Oroomiah, Persia, visited this country; they also visited this place. I made a list of inquiries, for Mr. Perkins to answer after his return to Persia, respecting silk. I also furnished the Rev. David Stoddard, of this place, a young man of fine talents and energy, with a list of questions, to answer at his leisure. I have received from him a letter, dated Oroomiah, July 25, 1845, (of which I have written a sketch to Mr. Wakeman,) accompanied by nine samples of silk made in Persia; and when he shall visit the silk districts, or meet with gentlemen of intelligence, will give me the result. He has also sent specimens of the white and black mulberry foliage—not equal in size to our Canton, Asiatic, or Broussa, either of which sustains our winters better than the white. The Canton retains its verdure longer, and in greater perfection, than any other, and by a variety of experiments it is shown that the same quantity of foliage will make more raw silk than any other variety. This is the *genuine* tree used in China, according to the testimony of Dr. Parker and a Chinaman, when here. They examined and recognised it at once. The blossoms for seed appear before

the foliage, like the peach, and very near the ground. Only a few are seed-bearing; and should the season be favorable, I may have a good gathering. The Asiatic, like the black and white, have fruit high up on the limbs. The Canton has been found to develope its foliage earlier than any other variety. It has been found that the foliage of standard trees will become diminutive in size, when compared with those headed annually.

"Joseph Clark, of this town, (one of the pioneers, with president Stiles and Dr. Aspinwall, in the silk cause,) sowed his white mulberry trees in drills, and kept them in a bushy state, and usually cut the branches with a scythe or sickle, in all weather; and if in the middle of the day, in dry weather, usually sprinkled the foliage with water. It is well known, that by heading down mulberry trees in the spring, the quantity of foliage is greatly increased, and the quality improved."

In referring to the State bounty, Dr. S. says:

"I do not regret that the Massachusetts bounty is put at ten cents per pound on cocoons only, nor that it is only for three years. At the expiration of this time, it may be revived with more ease than if it had been fifteen or twenty cents. The legislature wish to be governed by economy, and show themselves sparing of the people's money; however, the policy is not wise.

"The European governments have expended millions to establish the culture, and are now satisfied that silk is one of the greatest sources of revenue. A *like* policy here would be productive of similar results."

The doctor then very appropriately adds:

"But what is the use of having mulberry trees of any kind, *quality*, or size, and what the advantage of legislative or individual encouragement, if nobody can be found to improve and render them productive? From present prospects, Northampton may be in a *bad fix* the coming season. The culturist at the community has left them, and another large grower, having a great offer at Boston, will leave us in the spring, and my infirm health forbids my personal attention. A fine opportunity is here presented for some person of enterprise to come forward and make his selection. If no one should appear, (a half-dozen are needed,) you need not expect much from Northampton to eke out at the next silk convention. But I am in no way disheartened, come what will; and, if my life and health are spared, shall do what I can to keep the silk ranks *full*. There is an abundance of young and old trees, cuttings, and eggs, preserved for many beginners; but it is painful to see the apathy prevailing. Many are so eager to acquire wealth, that they cannot be content with the ordinary course, but must have railroad speed. Such a spirit must not enter the cocoonery; but patience and perseverance will be crowned with success. That America will yet become a silk-growing country, is not doubted by our best men; but when? Prejudices are being left behind; and let the friends of the cause look steadily to the time when silk shall become one of our great staples, and let us keep doing; examples of perseverance may work wonders."

Nothing gives us more real pleasure than the perusal of communications of this tried and devoted advocate of the silk cause in this country. While hundreds who arose in the time of the mulberry excitement—manifesting great zeal, making great speeches and writing extraordinary things on the subject, have fallen with its fall, he has remained steadfast, and may justly be considered a "standard work"—the American *text book*—containing all

that is important and reliable on the silk question. We feel honored in being made the recipient of his favors: may they be frequent and long continued. It is, indeed, a subject of regret that Northampton, standing, as she has, prominent in the silk enterprise, should at this time be deprived of two of her most efficient men. Mr. Payne has conducted the silk department of the "Northampton Association" with great perseverance and effect; and his absence must seriously cripple their further movements, and sensibly retard their progress. Mr. P. has incurred some prejudice on account of his connexion with "a new reel," which has been considered an improvement, but which has been adopted by some to their serious injury. We have had something to do with this ourselves, but are far from attributing any blame to Mr. Payne, and believe that, under some circumstances, it may prove all he believed it to be. Instead of reeling in long skeins, as is customary, this reel runs the silk on bobbins containing about two to four ounces each. In cases where manufacturers do their own reeling, we deem it of value, and so recommended as chairman of an *examining committee* of the national silk convention held in this city in 1844. We understand that Mr. P. is now in this city, with a quantity of fine sewings of his manufacture. Where his future movements are to be, we are not informed. We direct particular attention to Dr. Stebbins's remarks in regard to the mulberry, and advise silk-growers to furnish themselves with the Canton variety as probably best adapted to our country, particularly the northern sections. It appears to be as readily propagated as the multicaulis, and as well adapted to *branch feeding*, which are the chief advantages claimed for this variety, and which have been considered so great, by some, as to entitle it to the undoubted preference. Our *review* of the silk business will be resumed. It is discontinued for the present to give place to the above, as bearing a more intimate relation to the business at the present time.

A. C. VAN EPPS.

NEW YORK FILATURE, *January* 8, 1846.

SILK.

REPORT OF HON. P. H. GREEN.

We have before referred to the following report of Col. Green, who has this year been conducting his operations in Maine with admirable success. This report was made to the New England Silk Convention, held about one year since, and has been published by this State, in connexion with the report of the National Convention of Silk Growers, held at the American Institute in October last. It is one of those careful, wisely conducted experiments, which always insure success. The opinions of the writer on artificial warmth cannot be so readily adopted. We doubt not their adaptation to the latitude of New England, but further south the open system is doubtless *the* system to insure the greatest results; and even in New England, we think midsummer feeding would prove quite as successful in open and in close buildings. We concur most fully in the great importance of governmental encouragement, in order to establish the silk business upon a firm foundation. Some general provision should be made, and every State should have its bounty, and every agricultural association its premium, for cocoons and reeled silk. We have no doubt of the ultimate success of the business *without* such aid; but should every State follow the example

of New York, Maine, and Delaware, and give fifteen cents per pound on cocoons raised in the State, the results would be astonishing; and we suggest the idea here that the friends in each State get up a memorial to their respective legislatures praying for such a provision, and for its renewal in those nearly expired, as in New York. But to the report:

The silk culture in the United States attracted my attention some two or three years ago, since which I have not been an indifferent observer of what has appeared in the public prints, and other publications relating to the subject. These, with other evidence, have convinced my mind that, at no distant period, silk will rank among the most important productions of our country. Being desirous of obtaining practical knowledge, early last spring I leased, in this town, (Northampton, Massachusetts,) about five acres of land, four of which had, five years before, been planted with from twelve to fourteen thousand Alpine, Asiatic, multicaulis, and Canton roots and cuttings. Two places were fitted up for feeding—one put under the care of a person who had fed several years, and acquired the reputation of being a good feeder. No information would be conveyed by detailing the facts attending this attempt; it is therefore only necessary to add, that it disappointed both the feeder and myself. The other was reserved for myself, and the result more than met my expectations, being wholly unacquainted with the business. A full remuneration for the labor and other outlays were not among my most sanguine thoughts—of course I am not greatly disappointed; still I may, I think, truly say, that had the other feeding succeeded as well as that under my own care, although no profit would have been realized, an encouraging return would have been made. Three ounces of eggs were hatched, and the worms carried through, feeding principally without loss, except at the time of winding, when the weather was extremely cold and unfavorable; notwithstanding, I had two hundred lbs. of good cocoons from three ounces hatched. It is deemed unnecessary to trouble the convention with detail, and I will therefore only subjoin the result of my observation and experience from this feeding, and what has been done and is now doing in other countries not so well situated probably as our own. I have therefore come to the conclusion, that with the intelligence and means practised here, silk may be made an advantageous crop even in Massachusetts. The culture of silk in France was established by the bounty of government, and is now a source of great national as well as individual wealth. Nothing is hazarded in saying, if it is established here it must be done by the united effort of government and individuals. Since the discontinuance of the bounty, thousands of mulberry trees have been dug up in this and neighboring towns; and, without prompt action on the part of the legislature, thousands now are destined to the same fate.

[The above, as will be seen, was addressed to the New England Silk Convention. The letter of this gentleman to the National Convention is of great length; and as a part of it is a recapitulation of the above, it has been omitted. A. C. V. E.]

It was my design to feed three broods of worms in succession, so as to have the last brood wind up by the middle of August. In accordance with this plan, I took three ounces of eggs from the cellar when the temperature was 54° Fahrenheit, placed them in a room where it was 60°, on the 13th of May; on the 17th removed them to a room where the temperature was

regulated by artificial heat, and ranged from 62° to 73°, until the 27th, when the hatching commenced—28th, 29th, 30th, and 31st, all hatched, or nearly so. While the temperature was at 70°, or over, the young worms were active, but became somewhat torpid when it was 64°; ranged from 65° to 70° until the 3d of June, when the whole were placed in the cocoonery. On the 4th, temperature down to 46°, worms quite torpid; supposed it all over with them; but revived on the 5th, when it was 70°, and went through perfect moulting, perfectly healthy; continued so through the 2d, 3d, and 4th; changed them after each moulting, excepting those put into the cradles, which were placed there immediately after the third moulting, and were not again changed. Some hundreds of the worms fell into the troughs of the cradles when first put into them; supposing them to be lost, no notice was taken of them till the third day, when it was deemed necessary to wash them out; accordingly, a but of water was turned into the trough at the upper end; of course the worms were carried out at the other end. This immersion, as well as fasting, had not, as was expected, deprived them of life; indeed, it had made but little change in their appearance; they were therefore all secured, by placing a sieve at the lower end of the trough, placed on dry shelves, and food given them; and, in order to ascertain whether the drenching and fasting would have any unfavorable effect, a particular place was assigned them; they went through feeding in all respects as the others, and made as good cocoons.

Judging from this and other facts that subsequently came under my observation, I feel warranted in saying, although drenching worms for a short length of time before the fourth moulting may do them no essential injury, yet nothing can be more fatal than to keep them in a wet or damp place, particularly when about forming and completing cocoons. Worms hatched May 28th and 29th were put into the cradles and on the lower shelves in the loft; the last hatched on the upper shelf, near the roof; as they approached towards maturity, it was found that all were too much crowded, and about one-third were removed to the shed. All continued healthy, and about the first of July commenced winding. On the morning of the 4th, the temperature was 50°; on the 5th, 48°; and several succeeding days about the same. This was a severe shock to the worms; indeed, it so paralyzed a portion of them (probably from 10 to 20 per cent.) that they seemed to lose the power of making cocoons, grew chubby, and died.

It was apprehended that the loft, in warm weather, would become so hot as to have an unfavorable effect on the health of the worms. But, instead of this, the least loss was on the upper shelf, where the last hatched were placed, and spun as early as the first hatched, and made quite as good cocoons. From the fact that the worms, while young, were not injured by being subjected to a temperature of 46°, and about the same, at a more advanced age, had such a paralyzing effect that a considerable portion never recovered, it is inferred that a warm temperature is more essential during the last than first age of the worms. The product of the first three ounces of eggs was two hundred pounds of good cocoons. It is deemed proper to mention that the lower story of the building is separated from the upper only by a partial floor, so as to give a free circulation of air through the whole house. The windows have sliding shutters below, and in the loft a door at each end, but no windows or other openings in the roof; also, chloride of lime was placed, in small quantities, in all parts of the building, and fine unslacked lime sifted through a bag, made of coarse cotton

cloth, on the worms, in wet, damp weather, immediately after feeding. This not only absorbed the dampness, but is believed to have contributed to their general good health.

I found, by experience, that the chrysalids could not be destroyed by the use of charcoal. A description of the plan, manner of fitting up, &c., is not thought necessary. The experiment was, however, conclusive, and it is confidently believed that whoever makes the same attempt will find that a portion of the chrysalids will not be destroyed.

A better mode of destroying them, and which proves effective, as well as every way satisfactory, is one recommended by Mr. Banne, a distinguished French chemist, which is as follows: Dispose the cocoons in a wooden box, in a stratum of six inches deep; upon each superficial square foot of these sprinkle half a pint of alcohol from a water-pot, so as to distribute the liquid equally over the cocoons; then form another stratum over these, and a further quantity of alcohol applied, and so on until the box is full; then let them be closely covered and left twenty-four hours. Instead of a box, I used a barrel that had contained alcohol, cut a space ten inches square in the head, nicely fitted a board with lists on each edge, so that when it was down all the air was excluded from the barrel. This did the thing perfectly.

With regard to the succession of crops, before mentioned, the eggs reserved for them were placed in a cellar where the temperature was 54°, and, according to the opinion of some writers on silk culture, they would not hatch without being exposed to a temperature above 60°. Contrary to expectation, as soon as the mercury went up to this point, the eggs hatched; this, too, when I was wholly unprepared for them, having neither feed, space, nor time to attend to them; of course they were lost. Not willing to relinquish my plan altogether, about two thirds of an ounce of eggs were procured, which hatched the 23d and 24th of July; these went through their first and second moulting on the sixth and twelfth days of their age, without any loss; third, nearly as well; fourth, not so successful, the weather about this time being rainy and extremely cold for the season, with constant and sudden changes, which produced torpidness of the worms, from which they never recovered; a considerable portion of them formed cocoons, but few perfected them. The first part of the season is unquestionably the best time for feeding; still it is believed, with proper attention to selecting feed, congenial temperature, say about 70° or above, (natural best; but if this cannot be had, artificial, for later crops,) may be successfully used.

Much has been said and written about open feeding; no matter how open, provided all other requisites can be had. In the humble opinion of the writer, whoever expects to produce a good crop of cocoons from worms subjected to wet or damp atmosphere for any length of time, and to a temperature below 65 degrees, will be sadly disappointed. In Lombardy, Italy, and France, the great silk-growing countries of Europe, the temperature in cocooneries is not only regulated with great exactitude, by artificial means, but the atmosphere corrected from time to time as occasion may require. In those countries the feeding season lasts but six weeks, and is as certain there as any other agricultural product.

There, the leaves from trees (not annually cut down) are used; of course, but one crop can be produced. This is no objection to a succession of crops in New England, where the trees are cut down in the spring, early shoots cut and fed to the worms, and later are constantly springing up, suitable for feeding. That the United States are at no distant period to be-

come a great silk-growing country, is more than probable; that New England will share largely in the product, is not so certain. While the foreign producers and others interested are watching with eagle eyes the progress of silk culture in this country, at all times prepared to overstock the market with raw silks, and constantly doing so for the express purpose of checking its culture here; while not one in five of our citizens who engage in it are remunerated for their labor and other outlays; while thousands of mulberry trees in this and neighboring towns have been dug up, and thousands more destined soon to share the same fate; and while the subject requires systematic investigation and revision, as well as simplification, it cannot be reasonably expected that individuals will make the necessary advance to compete successfully with such formidable obstacles.

REMARKABLE SUCCESS IN PENNSYLVANIA.

We last week referred to Mr. Summey's operations in Manheim, Pa. We have now the particulars, under date of August 21, as follows:

"We have been doing very well this summer; much better than could be expected under more favorable circumstances. Our trees were all, or nearly all, planted and re planted last spring. We have now between twelve and thirteen acres of young trees, from two to six feet high, from which we have now fed and gathered over fifty bushels of cocoons, besides those now ready to gather, spinning, and coming on; so that we have the prospect of making one hundred bushels of cocoons this season. We keep the small worms in the house; but, after the third or last moulting, remove them to the open shanties, where they require no more cleaning, but plenty of foliage, and branches or straw to spin in.

"Messrs. Carson & Rice, of Lancaster, may not reach quite one hundred bushels of cocoons; Mr. Here, between sixty and eighty; and Mr. Chrisman, from twenty to thirty bushels, which we intend reeling here."

The gentleman last named commenced last year, and made 8½ bushels. The farmers in this neighborhood are rapidly following Mr. Summey's example; and if they follow his plans fully, we predict for them like encouraging returns. We see in this one place now probably two hundred and fifty bushels of cocoons at least. We can call to mind several other places where some one farmer has thus commenced the culture of silk in this simple, natural way, and by his example induced his fellows to do the same; and this is the way new pursuits must be introduced. Let those, therefore, who are convinced that the thing *can* be done, make themselves the *first* advance, and they will not long be alone; and let all engaged in or commencing the business bear in mind that at the New York filature there is always an amount of cash in deposite for every bushel of cocoons offered; and we intend in a few days starting out on a thorough tour through the country to collect the precious materials; and hope, in anticipation of our call, that every grower will have his cocoons thoroughly cured, carefully flossed and assorted, in readiness for barreling for transportation to New York. We want 1,000 bushels, immediately.

A. C. VAN EPPS.

NEW YORK FILATURE, *August* 30, 1845.

MISSISSIPPI AGAIN.

The following statements are from Mr. W. H. Benton, of Raymond, Mississippi. It is mainly through such limited experiments that the large quantities of cocoons in our country are produced; and if we are able to supply our demand for silk by our own production, it will be by small quantities being raised by nearly all our farmers. In France, and other silk-growing countries, this is the case. There, it is quite as uncommon to see a farm without its mulberry orchard, as it is here to see one with. They raise but one crop, so that their feeding season is only of about six weeks' duration. As soon as the cocoons are cured, every bushel is carried to the *filatures* and exchanged for *cash*. In most parts of our own country, three, four, and frequently more feedings may be made in the season, with results quite as favorable as one. It will be a most happy circumstance for the United States and their population, when farmers generally make it a part of their summer's business to raise at least a small quantity of cocoons. We deem it the duty of every person, and particularly the conductors of the public press, to urge this measure upon the attention of our people. If the quantities of trees amongst us are improved to good advantage, it will take but a few years to provide a full supply. There are now many plantations unoccupied, and their owners without eggs to use their foliage; and it was with the desire of providing for the employment of these that we proposed in our last number to furnish such persons with eggs, and receive cocoons in payment at the end of the season; and we trust the proposition may be improved. Mr. Benton says: "My object in feeding worms this season was only to obtain a stock of eggs for the next, and to make such experiments as to the manner of rearing the worm as would throw light on future operations. In the limited experiment of this year, I have not been able to arrive at any satisfactory results as regards the profits of the business. It was not to be expected, nor was it a question with me. I have considered it as already settled that it is the best mode of remunerating labor *under certain circumstances;* i. e., where the laborers are unfitted for field work.

My worms consisted of three varieties—the light yellow, deep yellow, and white. Not having as yet reeled any of the cocoons, my preference for the white is merely for its beauty and size; and most of my eggs saved are of this variety. My worms were all mixed together upon the shelves, and I cannot therefore say which were the most healthy. I lost probably not more than a hundred by disease, out of about 10,000; and that loss was, I think, occasioned by the crowded state of two of the shelves. My feeding was altogether from the wild mulberry, but of various kinds. One kind I find near my house, which I think far superior to the multicaulis—the leaves are very large, very thin, tender, soft, and flexible; the young branches have a velvety appearance, which distinguishes it from any other I have seen. It however remains to be seen whether it can be easily propagated, for in this I think the grand superiority of the "morus" consists. My opinion is decidedly in favor of using cut leaves entirely, in all stages; and as I have no doubt this opinion coincides with that of the best informed, it is unnecessary to state the reasons for it."

[We saw last season at Newark, in this State, some fine experiments with cut leaves, yet could not be induced to substitute it for open branch feeding on any consideration; besides being with three quarters more cost and

labor, the chances are all in favor of the "new school" plan, because it is nature's plan, which is reason enough for its general adoption, however successful isolated cases on the other may prove.—V. E.]

"I tried various experiments with regard to *spinning*. The Greek mode is to *pile up* mulberry branches on the shelves, crossing them in all directions, and leaving the worms to spin among them, *as* they please, and *where* they please—a bad plan, for obvious reasons, to every one who has tried it. I tried two kinds of frames, made of sawed laths. By crossing the laths, boxes are formed of an inch square. Other frames were made by placing them in only one direction, thus forming grooves. This plan I find to be the best, as they are much easier made, and answer the purpose equally well.

"My expectations are fully realized. I did not expect that this year would show me what would be the profit arising from the business; but I did expect that I would show the practicability of employing time to advantage, which would otherwise have been wasted for want of ability to attend to any other employment."

[We have maintained, and do still maintain, that there is abundant unproductive labor in the United States to produce cocoons equal to our entire consumption.—V. E.]

—

SILK.—OPERATIONS AND RESULTS OF THE PRESENT SEASON.

We have been favored with a few statements from gentlemen who have been, to a greater or less extent, engaged in the rearing of the silk worm; and every item of experience corroborates most fully the opinions advanced in our last remarks in this department, viz: That to succeed, *some* degree of common sense—as *much*, certainly, as in raising a crop of corn, potatoes, or wheat—must be used; that farmers need no more expect a favorable result when their plantations are uncultivated, and hard, unnutritious food given to the worms, than to receive an abundant crop of corn, or any other grain, where the seed is sown on soil imperfectly ploughed, and afterwards left to contend with grass and weeds, until the time of harvest. We must have more consistency in this respect, before any great advance can be made. To show the importance attached to this subject by the best feeders in the world, we here give the substance of a statement made by an Italian, now a resident of this city, in relation to the course pursued by his father. He mentioned particularly one orchard of 10,000 trees. These were transplanted when about one inch in diameter, and six feet high. Preparatory to setting them out, the ground was laid out as follows: The rows were about fifteen feet apart, and the trees the same distance apart in the rows. Holes were then dug for the trees, about six feet square and two deep. The best portion of the earth thrown out was then returned to the bottom, to the depth of two or three inches, when the same depth of manure was thrown in. This is repeated; and when the hole is half full, a small conical pile of earth and manure is made in the middle, on which the tree (the roots having been carefully dressed) is placed, with a post at its side to support it. The remainder of the soil, with equal quantities of manure, is then returned. In three years these trees were nearly six inches in diameter, with large, beautiful tops; and then they commenced picking the foliage for us.

Here, the ground is prepared as for corn, and the trees laid down or set in the furrow, and generally without manuring, where they stand from year to year, in many instances, without receiving the slightest attention. The fallacy of attempting to feed silk-worms from the foliage of such trees needs no proof; and yet, from these very cases, discarding those that have proved successful, our cause has been judged and pronounced unfeasible, and the destruction of vast quantities of mulberry orchards has been the consequence.

In most cases where the trees have not been well cultivated, the hot, dry weather of this summer has rendered the leaves utterly worthless, and time and means devoted to feeding them have been worse than thrown away. An instance: A gentleman, practically acquainted with the silk business, in giving us his experience, says—

I left the city of New York about the first of May last to take charge of a plantation in Henrico county, Virginia. An extensive business had formerly been carried on here, and I proceeded with the hope of giving a new impulse to this business in Virginia, and securing an ample compensation to myself. The plantation once consisted of 30 acres, with a large cocoonery containing 14,000 feet of shelving, in which had been fed the worms from 50 ounces of eggs at a single crop. The orchard is now reduced to about 4 acres, (multicaulis,) and has not received *any cultivation* in three years. When I arrived, I found that, contrary to my expectations, I should be under the necessity of feeding such foliage as these would produce, and in an old-fashioned cocoonery, too. My first inclination was to return to the "land of the free." Having with me several ounces of eggs, however, I determined to remain and make the attempt. Another quantity of eggs soon came; but with them the commencement of an extremely dry season, which has almost literally "burnt us up," and given a September appearance even in June. I need not add that my expenses, not counting the loss of time, have exceeded several times all I shall realize from my cocoons. I concur most fully in the last article in the "silk department" of the Farmer and Mechanic, and wish it might be read and observed by every person at all concerned in the culture of silk. For the proprietor I have the highest regard, and I shall ever cherish the recollection of happy months spent in his worthy family. My confidence in the silk business remains unimpaired; and I believe that Virginia possesses all the natural facilities for becoming one of the greatest silk-growing States of this Union, and equal to any equal extent of country on the globe; but I rejoice that, like every thing else, the business must be conducted with system and consistency to insure success. Were this a plantation of my own, or should I again have charge of it, my first move would be, early in April to take up all the trees thoroughly, break up and prepare the land, increase its extent by six or eight acres, and replant the trees. In the middle I should have a place for a tent or shed, 150 or 200 feet long. With such an establishment, I am confident I should make more clear money than could by any other means be produced from any other 50 of the 500 acres of which this farm consists.

From the N. Y. Farmer.

MAINE.

The following appears in the Lincoln Telegraph, Bath, August, 7, 1845:

"SILK CULTURE.

"This product is not only attracting the attention of the legislatures of many States, but individuals, in all parts of the Union. It has been predicted by men of sound judgment and forecast that, at no distant period, silk would rank among the most important productions, and we see *no* reason to doubt the correctness of the prediction. It therefore becomes a question worthy the consideration of every agriculturist in New England, particularly in Maine. Should it be found that our soil and climate are adapted to its culture, surely an important article will be added to our products. Nothing is hazarded in saying that the mulberry tree flourishes *well* in Maine. This we know from several years' personal observation; so the foliage can be produced in any quantities; and the success we have witnessed in this town the present season leaves no doubt that a *profitable* crop can be produced. In the case alluded to, probably better cocoons, and a more healthy brood, could not be reared anywhere. Therefore, two facts seem to be established beyond a question, viz: that foliage of the best quality can be produced abundantly in Maine, and our summer is ample for the health and growth of the silk-worm.

"In Italy and France, the great silk growing countries of Europe, the crop is made in six weeks from the time of hatching the eggs. [Best feeders take their worms through in twenty-six days from hatching; in which case the feeding is kept up every two or three hours, day and night.—V. E.] It would seem, therefore, that all that is wanting in Maine is *practical knowledge*—which is not difficult to obtain—for the farmer to add a rich item to his products. The experiment we allude to, as coming under our personal notice in this town the present season, has been conducted by our fellow-citizen, Hon. P. H. Green, who deserves great credit for the deep interest he has taken in this enterprise, as well as the large amount of scientific and practical knowledge he has made himself master of, touching this whole subject. We hope Colonel Green will push his experiments another season to a still more magnificent extent. We are satisfied that no man is more peculiarly qualified as a pioneer in an undertaking which really promises so much for the future glory of the State."

The opinion of the editor of the Telegraph respecting the qualifications of Colonel Green to pursue the culture of silk can be readily endorsed by those acquainted with his views, experiments, and close observation, during his first season of feeding, and more particularly described in his able report to the New England silk convention, and the national silk convention of the American Institute, in New York, in October last. * * * He has in Northampton a quantity of superior silk-worm eggs, in fine condition for feeding. Colonel Green is a warm advocate for the application of artificial heat in cocooneries, to obviate the effects of sudden cold and chills. We are informed that last year he rented one of Dr. Stebbins's plantations, in Northampton, where he made the experiments alluded to in his report. Persons in Maine desirous of commencing the business will do well to confer with Col. G., as his close observation of the nature and wants of the silk-worm render him pre-eminently calculated to impart instruction. We

shall expect a particular account of his operations for this department soon. Success will always attend such efforts.

We have on hand further interesting matter for next week. Let all contribute their experience; for in this way alone can we fix upon the best system, and adopt it in practice.

A. C. VAN EPPS.

SILK CULTURE IN SOUTH CAROLINA.

In a letter from *Needham Davis*, of Barnwell district, South Carolina, relative to silk, he says: "The prospect of silk in this section of the country is poor indeed. The long warm spell through February and part of March brought out vegetation rapidly; the silk-worms hatched out early, and were prosperous until cold weather set in, destroying, in many places, peaches and many other fruits, and cutting down corn and much forward wheat—killing mulberry leaves. Many silk-worms were lost. I stripped bark from the mulberry tree; I took young twigs from them, and fed my worms with them. What few cocoons I have made are firm and of good quality. Few worms are diseased—not an average of five in a thousand. I shall soon state my method of rearing silk-worms. I mean to convince our citzens that they can raise silk to advantage; that the old and the young members of a family can be profitably employed at it. And hundreds will yet come into the business for their own profit, and the good of the country."

MULBERRY TREES.

We are happy to learn that the mulberry plantations of our friend Dr. Stebbins, of Northampton, are not included among those destroyed by the frosts of the last winter, as we had been informed, but are all under the superintendence of Mr. S. A. Clemens and brother, late of North Granby, Connecticut. At the west the destruction of mulberry trees has been much greater than was at first supposed. The orchard from which we did our feeding last year shows no signs of life yet, and it is feared the roots are killed. Had this been a destruction of fruit orchards instead of mulberry, the sympathy for the losers would have been very great; but as it is, few regret the loss. Said a gentleman from Moreau, a few days since, "I have lost all my trees, and it calls forth scarcely a passing remark from my neighbors. Had I lost $500 bank stock, I should have had sympathy enough. I should, however, have regretted less the loss of $3,000 bank stock than this."

The following letter is from Dr. Stebbins, under date of May 30th. The views of this gentleman are highly practical, and the country is much indebted to him for his uninterrupted devotion to the silk cause during the many difficulties which it has had to encounter, and we trust he may live to see the day of its triumph. Northern eggs are doubtless far better adapted to the south than those preserved there; and although we intend to do our principal feeding at the south, we shall feed here for eggs.

A. C. V. E.

Dr. S. says: "The season is yet rather unfavorable. We have had several frosts, which formed ice of the thickness of window glass; that of the 24th and 25th was rather severe for tender foliage. We have the ben-

efits of a bounty on cocoons to encourage the growth of silk. It was hoped this encouragement would induce many new beginners to undertake, but have not such evidence as is desirable. Another year, however, may show its fruits. When any business has been neglected or abandoned from any cause, it is often difficult to resume it courageously.

"A few out of this Commonwealth have awaked on the subject, in consequence of reading the '*Silk Question Settled.*' I have furnished to order several parcels of young seedling Canton trees and cuttings, and silk-worm eggs of the last year's crops, to individuals in the State of New York, and others more remote, and am making calculations for another year's supply, although I have not disposed of all my former stock, which can be retained until August before used.

"A gentleman from Vermont, with cocoons and reeled silk, is here, and wishes to insure a market for the new crop. I showed him your offer in the June number of the Farmer and Mechanic. He thinks the offer *too low* to send so far, and wishes for a midway market in the Connecticut valley; says there are many in Vermont who feed worms, and want a *cash* market. Cocoons have been sent here, but they do not like a barter trade.

"By accounts from various sections of country, it appears that the seasons are more irregular than in some former years, attended with sudden changes of atmosphere, and unfavorable for the silk-worm. It is a question worthy of consideration, whether we may not yet find it prudent to adopt the European practice of artificial warmth in our cocooneries, to obviate the effects of sudden changes of weather. Even the favored south may yet find a benefit of some apparatus to regulate the temperature of the cool, damp evenings, and the use of wires with reference to the effects of electricity.

"Difficulties have occurred in Jamaica, (W. I.) where the nights are comparatively cool and moist, where it may be necessary to resort to means for regulating the temperature of the evening air and moisture. A person who has fed worms in Jamaica has this day suggested to me that artificial warmth may obviate difficulties and prove highly advantageous, and also using silk-worm eggs from America, especially those raised in New England, in preference to any which have been propagated in the island. The creolizing system has not answered the expectation. Such was the result of experiment in the Sandwich islands, where the experiment was made of crossing the American with the native or China eggs. In our own country, would the northern eggs be better adapted to the south than eggs raised south? I have had silk-worm eggs from the south; and especially some sent me by the unfortunate Dr. Perrine, from Indian Key, Florida, proved a failure, from whom also I had a great variety of seeds which had not been sufficiently acclimated according to his most sanguine expectations; but all the seeds, plants, cuttings, and eggs, sent from here to him, fully answered the expectations.

"It is well known that Mr. Whitmarsh introduced a species of mulberry seed from Italy, gathered near the Alps, and here called Alpine mulberry. From this seed he raised large quantities of seedling plants, and transferred them to Jamaica for feeding worms upon its foliage, and, after a few years' use, found the leaf too hard and crude for the worm; and it is now understood that he has rejected them entirely, and has substituted the multicaulis and Canton as more congenial to the silk-worm.

"A person who took with him Canton seedlings from this town to Jamaica informed me that they flourished astonishingly, and grew in one season to

such a height as required heading down every three months. Such was the case in the Sandwich islands.

"As with fruits, so with the feed for silk-worms; there may be different degrees of goodness in the foliage, as the *good*, *better*, and the *best*. I have tried almost every variety, and have the vanity to believe that by actual experiment I have discovered the most profitable varieties for feeding worms adapted to this or any other climate.

"If our farmers should adopt the sentiments of Gen. Tallmadge, as expressed before the Farmers' Club, 'that silk is the most interesting subject that could be brought under the consideration of this nation—that no country on the globe, except China, can compete with the United States,' who could decline a trial of its merits, not only to insure personal prosperity and wealth, but to open an immense source for national revenue? The above sentiment is worthy of him who uttered it, and of every patriot in America, and should be promulgated throughout the whole length and breadth of the land."

From the Maine Farmer.

SILK CULTURE.

Our operations thus far have been on a small scale, but we believe that, under judicious management, the rearing of silk-worms may be extensively pursued, even in this cold region of frost and snow, with as good a chance of success as in the culture of corn, wheat, or any other product of the farm.

We have five hundred white mulberry trees of eight years' growth, which occupy one-fourth of an acre of warm, sandy soil, that was cultivated, while the trees were small, in potatoes, beans, &c.; only ten common cart-loads of stable manure having been applied since the trees were put out. Have a few hundred of the multicaulis mulberry also, but have used none of the foliage for feeding worms. Think they will not flourish well here.

In 1843 we fed 12,000 worms, which spun good cocoons, but accidentally lost 5,000 of them by fire. From the remaining 7,000, which weighed 28 lbs., we manufactured 1,000 skeins of sewing-silk. In 1844 we fed 20,000, but, from a want of experience in preserving eggs, the worms were unhealthy, and made poor cocoons: manufactured 500 skeins of sewing-silk, and seven handkerchiefs, worth $1 25 each. The past season we fed 22,000, which did well: made 2,500 skeins of sewing silk, 12 handkerchiefs, that were pronounced "good," and sold very readily at $1 25 each, and a mantle of superior texture, worth five or six dollars:

2,500 skeins of sewing-silk, at $3 per hundred - -	$75 00
12 handkerchiefs - - - - - -	15 00
A mantle - - - - - - -	5 00
State bounty - - - - - - -	9 00
	104 00
The expense of attending the worms, spinning, weaving, &c., at $1 per day, amounts to - - - - -	60 00
Profit - - - - - -	44 00

As to the profit of the silk culture, we are not prepared to speak with assurance, but would remark, that while the foreign article is by the community preferred to the domestic, the manufacture of sewing-silk cannot be profitable.

We would advise those engaging in the business to establish fixtures for reeling, and acquaint themselves with the process, as the "raw silk," well reeled, will always sell readily at a fair price.

Enclosed, for your inspection, is a fair specimen of the sewing-silk manufactured the past season as above.

J. S. LONGLEY.

NORRIDGEWOCK, *January*, 1846.

NOTE.—We were much pleased, on receiving the above communication and the specimen of silk enclosed. The specimen is well manufactured, is even in twist, and has a good lustre. We hope to hear from others who are engaged in this business. Let us know what progress you make. We suspect that Mr. Longley is situate farther north than any other silk-grower in the Union.

APPENDIX No. 13.

SUGAR.

Statement of sugar made in Louisiana, in 1844.—*By P. A. Champomier.*

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
Pointe Coupee.		
Charles Morgan - - - - -	200	210
A. Ferrier, next year - - - -		
W. Taylor - - - - - -	325	325
Augustin Leblanc - - - - -	43	48
Antoine Décuir, False river - - - -	320	300
Some ten new planters in the next two years -		
	888	883
West Baton Rouge.		
T. W. Chinn - - - - -	328	425
William Robertson - - - - -	180	210
John Nolland - - - - -	430	516
Villeneuve Leblanc - - - - -	355	465
James McCalop - - - - -	475	475
V. Dubroca & Bernard - - - -	145	178
Alexander Barrow, next year - - -		
J. V. Durald & Co., do - - - -		
S. Hiriart - - - - -	270	320
J. C. Patrick - - - - -	400	420
Ursin Soniat & Co. - - - - -	302	360
Noland Stewart - - - - -	438	500
Zéphirin Blanchard - - - - -	254	254
Jacques Molaison - - - - -	108	108
Joseph Landry & Co., next year - - -		
Valentine Hébert & Co. do - - -		
Levêque et Landry - - - - -	165	170
Ely Landry - - - - - -	157	160
Daniel Hickey & Co. - - - -	240	250
Twenty-four new planters in the next two years -		
	4,247	4,811

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
East Baton Rouge.		
John Klempeter, Highland	56	59
J. B. Klempeter, do	254	275
Perkins Brothers, do	615	750
General Bernard, next year		
Mrs. Combs, do	96	105
Mrs. Duplantier & Stevens, river	248	300
Stephen Henderson	335	390
Dr. Williams	318	350
Colonel P. Hickey	167	175
Caldwell & Hickey	106	112
F. D. Conrad	315	330
General Bernard & Co.	72	75
Estate of J. Martinez	65	65
Abraham Bird	406	445
Sosthène Allain	420	485
Mrs. F. Duplantier	455	490
Josiah Barker	364	435
Devenport & Cavelier	182	185
	4,474	5,026
Iberville.		
RIGHT SIDE.		
Camille Landry & Co.	212	240
— Rims, next year		
Balthazar Dupuy	250	295
Thomas Mille & Co.	241	270
Louis Désobry	240	240
Paul Dupuy	174	190
Joseph Schelatre	271	285
Michel Schelatre	344	420
William Dodd, Bayou Jacquot	293	340
Mrs. L. Robertson do	198	226
Klempeter & Roth, Bayou Plaquemines	86	95
Dupuy & Mille, do	230	255
J. A. Dardenne, do	228	250
Nérault Rousseau & Dupuy, Bayou Plaquemines	90	89

STATEMENT—Continued.

Names of planters and parishes.		Actual hogsheads.	No. of 1,000 lbs. net.
Iberville—Continued.			
RIGHT SIDE.			
Materne & Co.,	Bayou G. Tête	100	110
Gréaud & Dègre,	do	252	290
Estate of E. Slake,	do	130	145
Edward & Whitall,	river	307	340
Rills, Bruslé & Co.,	do	270	295
Hynes & Craighead,	do	960	1,000
Dr. Stone,	do	425	465
Paul Dupuy,	do	395	430
R. Johns,	do	248	300
Dr. Clement & Dutton,	do	178	200
Valery Hébert,	do	344	352
Honoré Dègre,	do	95	100
René Bougère,	do	303	325
E. G. W. Butler,	do	333	333
Mrs. P. M. Lambremont,	do	124	142
Janvier Allain,	do	125	140
Paul Hébert,	Bayou Goula	352	355
R. Lambremont,	do	133	145
— Wilson,	do	109	109
Sewell & Hudson,	do	294	336
John Garlick,	do	186	186
A. Fisk,	river	406	446
Dr. Doyle,	do	168	190
Joseph A. Hébert,	do	65	70
S. C. Pollard & Co.,	do	352	380
George Deslhonde,	do	136	145
Mrs. Vaughan & Hébert,	do	608	660
N. Cropper, late Heath,	do	86	90
Mrs. Cyprien Ricard,	do	325	370
Christopher Adams,	do	340	360
Norbert Cropper,	Back Concession	368	420
Saml. Harrison & Co, Back Concession, next year		...	
John Andrews		760	830
Mrs. E. Lauve		578	650
Achilles Sigur		410	465
Thompson & Montgomery		688	730
Some three or four new planters in Grosse Téte			
		13,810	15,118

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
Iberville—Continued.		
LEFT SIDE.		
E. W. G. Brown, next year - - - -		
J. B. Christain, do - - - -		
Dupuy & Barker - - - - -	60	60
D. Chambers & Co. - - - - -	177	230
André Leblanc & Co. - - - -	118	130
Dr. Stewart - - - - -	92	100
Wm. H. Avery - - - - -	350	350
E. Moore - - - - -	250	240
Antoine Dupuy - - - - -	120	135
Simon Leblanc - - - - -	125	140
Dr. J. Pritchard - - - - -	208	235
Simon Leblanc & Co. - - - -	155	172
Ursain Joly, next year - - - -		
Allain & Babin - - - - -	94	105
R. Arnous - - - - -	245	275
R. P. Gaillard - - - - -	120	132
John Hagan - - - - -	150	165
R. C. Camp - - - - -	300	310
Wm. Gorham & Co. - - - -	89	92
	2,653	2,861
Ascension.		
RIGHT SIDE.		
Johnson & Keyes - - - - -	335	370
N. Mélançon - - - - -	84	84
Siphrin Babin - - - - -	79	79
Ed. Duffel, jr. - - - - -	85	85
W. H. Gilbert & Co. - - - -	167	167
W. C. Vantress - - - - -	282	310
Judge Ed. Duffel - - - - -	255	255
Joseph Leblanc - - - - -	85	85
J. B. Gaudin - - - - -	292	292
Mrs. Victor Landry - - - - -	84	84
Valentin Landry - - - - -	106	106

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
Ascension—Continued.		
RIGHT SIDE.		
Narcisse Landry - - - - -	772	772
Trasimond Landry - - - - -	835	920
Joseph Blanchard - - - - -	288	288
Richard McCall - - - - -	282	295
Henry McCall - - - - -	1,019	1,075
Valery Landry - - - - -	464	464
J. B. Letorey, Bayou Lafourche - - -	455	475
Pierre Airaux, do - - - -	77	77
D. A. Randall, do - - - -	82	88
T. B. Scott, do - - - -	96	96
R. R. Barrow, do - - - -	245	265
Valery Landry, river - - - -	188	188
Ed. Gaudin, do - - - -	290	290
Eloy Mélançon, do - - - -	43	43
Trasimond Landry, do - - - -	332	365
Mrs. J. Connand, do - - - -	350	350
Mrs. Louis Mollère, do - - - -	321	321
J. P. Viala, do - - - -	119	135
Eugène Lacroix, do - - - -	120	138
Col. Preston, do - - - -	358	375
Mrs. Pédesclaux, do - - - -	337	384
	8,927	9,321
LEFT SIDE.		
S. & R. Tillottson - - - - -	350	350
Wm. J. Minor - - - - -	812	900
Henry Doyle - - - - -	1,539	1,750
T. P. Minor - - - - -	683	785
D. F. Kenner - - - - -	1,156	1,200
H. B. Triste - - - - -	566	566
Mrs. Allain Gautreau - - - -	36	36
Mrs. Dernon Leblanc - - - -	60	60
J. Waters & Zacharie - - - -	185	185
Dr. Prévost - - - - -	103	130
M. D. Bringier - - - - -	505	505

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
Ascension—Continued.		
LEFT SIDE.		
Louis Colomb	500	520
J. B. Marchand	80	88
Col. Preston	1,966	2,100
Laurent Millaudon	585	630
M. D. Bringier et Son	1,170	1,170
	10,296	10,975
St. James.		
RIGHT SIDE.		
Mrs. Joseph Mélançon	155	155
Onézime Leblanc	87	95
Mrs. Joseph Gautreau & Co.	268	268
Nicholas & Bell	555	620
Evariste Mire, next year		
Evariste Blouin	185	212
B. Winchester	766	790
Valery Gaudet	365	375
Michel Bergeron	265	265
François Gannier & Co.	297	297
Poirier Brothers	158	165
P. M. Lapice	666	740
E. J. Forstall, ex Poëfarré	654	732
M. B. Cantrelle	350	375
Estate of Mrs. Wèbre	514	514
J. X. Cantrelle	228	234
A. B. Roman	505	525
Choppin & Roman	450	485
David & Robin	616	636
Mrs. V. Roman & Co.	434	445
T. S. Roman	516	545
Valcour Aime, refinery	1,152	1,200
J. B. Armant	718	840
Duparc & Locoul	727	765
Sosthène Roman	570	660

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
St. James—Continued.		
RIGHT SIDE.		
L. Simon & Co.	84	86
J. S. Armant	380	425
Evariste Champagne	52	52
	11,817	12,501
LEFT SIDE.		
Mrs. Tureaud & Co.	640	660
Mrs. James Conway	295	305
Aristide Landry	144	160
Mrs. Donat Landry & Co.	142	142
J. B. Penny & Co.	406	500
Mrs. Alexander Mélançon	140	140
Jean Chardon	36	36
Joseph Hèbert	76	76
Noël Jourdan et Gaudin	380	365
Ed. Jacob & Co.	530	570
P. & O. Colomb	150	150
Adolphe Malarché	27	27
Vasseur Wèbre	90	90
A. Bourgeois	88	88
Mrs. Malarché & Son	252	280
François Duhon	112	112
J. B. Boucry & Co.	242	242
Samuel Fagot & Co.	725	804
Arnaud Lebourgeois	144	144
W. Whelam, late Chapduc	27	27
Donat Guédry	16	16
Pierre Thériot	500	505
J. B. Caillouet	35	35
Whelam & Godberry	508	508
Mrs. L. Lebourgeois	550	535
Mrs. Mathers & Co.	553	530
A. Ferry & Co.	327	380
Eugène Bourgeois	18	18
C. & D. Bourgeois	16	16

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
St. James—Continued.		
LEFT SIDE.		
Edouard Bourgeois	224	224
J. L. Delate	149	149
J. B. Parent & Co.	154	154
Divin Bourgeois & Co.	265	265
Jean Lêche	89	89
Dr. A. Hemphreys	256	256
François Reine	134	134
Gervais Gaiennié	228	228
Moses Shepherd	808	888
Armant Duplantier	326	350
	9,802	10,198
St. John Baptist.		
RIGHT SIDE.		
Sylvestre Webre, vacherie	114	114
Mrs. Marcelin Haydel	326	356
P. C. Becknel & Co.	190	203
Antoine Haydel	49	49
B. M. Haydel	558	558
P. A. Becknel & Co.	362	407
Dr. Weindahle	408	428
J. J. Haydel	406	426
Victorin Haydel & Co.	138	138
George Roussel	76	76
Armant Gravois	178	190
P. A. St. Martin	299	299
Louis Roussel & Co.	198	198
P. B. Marmillon	68	68
V. B. Marmillon	788	788
Ursin Haydel & Co.	262	262
François Webre & Co.	256	256
Mrs. Zéphirin Barrey & Co.	227	227
Cyprien Songis	142	142
Thos. May	318	364

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
St. John Baptist—Continued.		
RIGHT SIDE.		
Julien Bossier & Co.	209	209
Hubert Darengsbourg	126	126
Norbert Ranson	372	372
	6,070	6,256
LEFT SIDE.		
C. & E. Fortin	253	280
Mrs. George Roussel	420	420
Pierre Landreaux	380	400
Adams & Behan	305	305
J. B. & P. Picoux	103	103
E. B. Marmillon	505	525
Zénon Montz	90	90
St. Fort Dusseau & Co.	185	180
Ludger Vickner & Co.	82	82
Guyol & Deslhonde	172	172
Louis Trègre	182	182
Andry & Boudousquié	515	530
Louis & C. Madère	46	46
André Madère	84	84
Gabriel Vickner & Co.	80	80
Auguste Madère	84	84
Honoré Lagroue	102	102
André Deslhonde	573	540
Similien Labranche	475	520
Etienne Trépagnier	320	320
Jacques et Adam Lèche	46	46
Jacques Clément	128	128
Antoine Vickner	205	205
Marie Louise Panis	660	620
Marin Reyne	380	390
François Loriot	74	74
André Montz	152	152
Hollingsworth & Co.	540	540
Norbert Louque	305	305

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
St. John Baptist—Continued.		
LEFT SIDE.		
Octave Elfer	51	51
George Vanprain	8	8
Mrs. Arnauld & Son, lost by crevass		
	7,505	7,564
St. Charles.		
RIGHT SIDE.		
Garcia & Sorapuru	1,015	1,015
Mrs. Deneufbourg	318	312
Mrs. Zenon Ranson	485	485
Charles Perret & Co.	305	315
Joseph Bourgeois	87	87
Mrs. Charles Perret, fils	535	535
Chauvin & Levois	400	400
J. B. Troxler	120	128
François Troxler & Co.	162	162
Mrs. A. Brou & Son	287	325
Mrs. Delery & Bry	224	234
Ed. Fortier	532	540
Chas. Rixner & Co.	132	132
Joseph Girod	335	365
Mrs. J. B. Labranche	500	500
François Meyronne	305	295
George Rixner	284	303
Chas. A. Jacobs	607	607
Mrs. Massicot	278	295
St. Martin Méchin	20	20
Onésiphor St. Amant	350	350
J. B. St. Amant	72	72
D. Lanaux & L. Charbonnet	370	370
	7,723	7,847

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
St. Charles—Continued.		
LEFT SIDE.		
Honoré Landreaux	52	58
Mrs. Delhomère	326	326
P. A. Rost	188	205
Charles Oxley	178	195
Mrs. F. Trépagnier	338	338
Hermogène Labranche	510	500
Mrs. Drauzin Labranche	385	385
Mrs. McCutcheon	595	690
P. A. Rost	575	630
Pierre Soniat	65	70
O. & A. Labranche	170	185
Mrs. Louis Labranche	648	670
F. Pizeros	339	339
Ed. Fortier, fils & Co.	440	440
	4,809	5,031
Jefferson.		
RIGHT SIDE.		
Joseph Dusseau	505	550
Edouard Fortier & Co.	186	205
Eugène Fortier	304	334
Mrs. Waggaman	496	510
Lucien Labranche	1,016	1,100
Camille Zéringue, next year		
Harang Fazende & Co.	500	500
Laurent Millaudon	600	600
Laurent Millaudon	805	805
Verloin, Degruys, & Fazende	490	490
Osborn Brothers, Barataria	430	430
Delery & Villard, do	448	460
Andrew Hodge, jr., do	505	505
John Davis, do	400	440
Drouet Frères, do	575	560
Forstall Frères, Grande Terre	333	333

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
Jefferson—Continued.		
Colmenero & Ribas	431	510
	8,024	8,332
LEFT SIDE.		
Butler Kenner	675	735
Minor Kenner	756	870
René Trudeau	235	245
Pierre Sauvet	590	615
J. Soniat Dufossat	455	455
Lacestiére & P. Labarre	268	290
Arnoult Frères	215	215
	3,194	3,425
St. Bernard.		
RIGHT SIDE.		
Pierre Hoa	306	306
Casimir Lacoste	355	355
J. B. Laprêtre	330	345
Dussuau Delacroix	218	218
Caliste Villeré	342	405
	1,551	1,629
LEFT SIDE.		
Gabriel Villeré	372	352
C. Chiapella	262	290
J. Hewett	116	126
Mrs. A. Phillippon	202	202
L. D. Beauregard	136	136
M. & A. Ducross	215	240
B. Poydras	786	786
Marine and Fagot, Terre au Bœuf	65	65
Laurent Millaudon	232	232

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
St. Bernard (left side)—Continued.		
Estate of Jorda	305	335
Bienvenu Brothers	285	295
Estate of Jorda	298	325
Jacques Toutant	400	400
Pierre Rèaud	142	142
Mrs. G. Olivier	415	435
Mrs. A. Régio	565	565
Proctor Brothers	570	570
A. Michoud, Chef Menteur	24	24
	5,390	5,520
Plaquemines.		
RIGHT SIDE.		
Jules Villeré	315	354
Félix Villeré	226	250
A. & J. Denistoun & Co.	515	540
A. Gordon	383	383
Estate David Urquhart	390	410
Anatole Villeré	387	426
Estate M. Regio	385	385
Rapp et Deblanc	222	244
Bernard Marigny	385	455
B. Bahie	102	112
P. J. Fletas	168	172
B. Bahie	222	245
W. Erskins	312	340
A. Dunford	304	304
Samuel Packwood	836	1,000
R. Montgomery & Co.	500	550
Maunsel White	610	690
R. Wilkinson	308	340
J. B. Wilkinson	525	575
George Johnson	530	530
Isaac Osgood	658	726
	8,283	9,031

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
Plaquemines—Continued.		
LEFT SIDE.		
Wm. H. Morgan	625	685
J. A. Morgan	635	695
Arnaud Lanaux	441	476
A. Lesseps	500	550
Joseph Saul	584	610
M. Ribas	336	350
F. Delery	215	228
Charles Regio	222	240
Bufford & Gordon	448	448
Lizardi Brothers	897	1,085
A. Lesseps	800	880
P. C. Wederstrand	286	310
Estate J. H. Cornin	179	200
Brulard Brothers	158	170
Colonati & Adams	152	165
	6,478	7,092
Assumption.		
BAYOU LAFOURCHE—RIGHT SIDE.		
Joseph Gravois	41	41
Simon Leblanc	52	52
J. Simonot	119	119
Carville Verret	94	94
St. Julien Tournillon	309	476
Dr. Jos. Martin	540	560
J. B. Landry	250	240
B. J. Devenport	350	350
Henry Landry	143	155
Hippolite Landry, Bruslée	36	36
Hébert Brothers, do	42	42
Molère Loguet, do	41	41
André Leblanc, do	82	82
Alexis Blanchard, do	82	90
Col. A. Pugh	707	780

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
Assumption (Bayou Lafourche)—Continued.		
E. & E. Commeau	128	128
Wm. H. Sparks	460	540
E. E. Kitridge	580	695
P. Landreaux	432	480
Philip & Rhea	346	330
P. L. Cox	483	525
Jos. Gautreau	46	46
J. L. Labadie	96	120
August Tête	430	450
Some 8 to 12 new planters in the next 2 years.		
CANAL AND BELLE RIVIERE.		
Bissley & Barrow	228	250
Florentin Michel & Co.	58	63
Hippolite Porche	16	16
A. Rousseau & Co.	35	40
Hue & Berthwick	26	28
Green & Roberts, Bayou Bœuf	16	17
Robert Love, do	18	20
B.E. Pénisson, do	78	85
Daniel Morrisson do	214	235
Louis Bourgeois & Co., do	28	30
George Shewing & Co., do	149	165
	6,845	7,421
LEFT SIDE.		
F. M. Lévêque	337	375
Comte de Gaalon	327	410
Gravier Plaisance, Bruslée	36	36
Miles Taylor	206	206
Manuel Fernandez	210	210
J. B. Vinson	91	100
A. A. Truxillo & Co.	265	250
Antonio Véla	263	263
François Bougère	50	50
J. B. Guillot	72	72

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
Assumption (left side)—Continued.		
Louis Guillot	66	66
Gustave Jumonville	88	97
A. W. Pichot & Co	76	85
Sparks Brothers	79	79
Templet Brothers	66	66
J. B. Guillot & Co.	135	135
Estate F. Bourg	100	100
Dr. Monnot	102	112
Ths. Pugh	756	835
Mrs. J. Lallande	154	165
Estate of D. Boatner	276	300
W. W. Pugh	356	356
Etienne Landry	222	222
Mrs. Barrillot	152	170
R. C. Martin	318	345
Estate N. Girod, Dr. J. Martin	200	210
Amedée Tête	142	142
4 or 6 new planters in the next 2 years.		
	5,145	5,457
Lafourche Interior.		
RIGHT SIDE.		
N. Haydel	65	65
E. D. White, (45 burnt)	112	118
Jean Wébre	173	185
M. Bernard	70	75
Allen & Robertson	465	515
Bishop Polk	775	850
Pugh & Dardenne	342	370
J. B. Bernard & Son	144	150
G. S. Guyon	361	390
P. M. Lapice	414	414
Michel Bourgeois	66	66
Edouard Bergeron	46	46
	3,033	3,244

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
Lafourche Interior—Continued.		
LEFT SIDE.		
Aillot & Troxclair	155	155
J. P. Boudreau & Co.	109	109
Baptiste Blaise & Co.	164	164
Léonard & Périlloux	143	143
F. Haymel & Laseigne	117	117
J. J. Rousseau	106	106
J. B. Moreau & Co.	557	557
James Bellew & Co.	184	184
Henry Ledey	160	160
B. Cross, Brulée	316	335
J. B. Callouett, do	102	102
Ths. Bibb, C.	358	358
Wm. N. Fields	170	170
Ths. Bibb, J.	928	1,010
A. Collins	471	500
Mrs. Gaudet et Toups	156	156
J. Tuker & Co.	730	770
J. C. Williams	138	145
Maturin Pitre	108	118
Ths. Bibb, W.	428	468
Mrs. C. Aubert	275	275
Wabishpack & Co.	91	91
Mrs. E. Champagne	86	86
Mrs. Charles Falgout	52	52
Bouche Guesnow et Lepine	42	42
Léonce Falgout et Gaudet	153	153
R. R. Barrow	625	650
Aubert Brothers	335	340
Evariste Lépine	101	110
Pierre Lefebvre	798	860
Estate A. Robertson & Co.	760	800
Mrs. Otard & Birdsal	103	103
Jacques False	154	154
Derbigny & Lebreton (Back)	500	500
Col. A Pugh	556	610
Mrs. Mathews	895	935

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
Lafourche Interior—Continued.		
Honoré Carlin	46	46
	11,172	11,634
Terrebonne.		
Pierce Butler	415	470
Mrs. L. Tanner	708	770
H. M. Thibodeaux	256	290
Mrs. H. S. Thibodeaux	608	620
Leufroy Barras	384	384
Evariste Porche	145	145
R. G Ellis	354	400
R. G. Ellis	528	585
F. L. Meads	185	195
Thibodeaux & Beatty	500	600
W. D. Douning	218	245
S. C. Lawless	286	310
L. Clifton	336	360
Tobias Gibson	500	500
Noah Hampton	43	43
R. R. Barrow	306	345
Dr. Danks	62	70
Shields & Temple	234	270
Mrs. E. Fanguy	12	12
Estate H. M Bellanger	66	72
Mrs. Dr. Pierce	126	140
Bissland & Watson	625	645
Jean Bourg	38	40
McDonald & Barrow, Bayou Black	355	410
Js. J. Hanna	505	530
Wm. A. Shafer	245	260
Wright & Barrow	34	38
Minor & Winder	579	630
Bond & Barrow	445	475
Knight & Brillant	41	43
Conley & Kitridge	268	315
Hatch & Grinnage	76	80
Boutloup & Clifton	61	64

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. ped.
Terrebonne—Continued.		
C. C. Wallis	81	88
Jeremiah Mumson	144	158
Knight & Baker	217	235
James Carll	64	64
James Cage, Grand Caillou	965	1,060
Barrow & Baker	193	210
Ths. Butler	408	450
Capt. Quittman	295	320
John Pelton	750	820
	12,661	13,801
St. Mary.		
ATTAKAPAS—ABOVE FRANKLIN.		
John C. Marsh, Island	409	435
Hayes & Rose, Petite Anse	336	368
Dr. Peebles & Co., Prairie	380	420
J. W. Wilkins & Co.	320	365
Charles Deblanc, Bayou Têche	122	135
Major C. Olivier, do	268	320
F. O. Darby, do	342	440
Ths. H. Thompson, do	132	148
Olivier & Richardson, do	173	173
Nicholas Loisel, do	224	255
R. McCarty, do	48	52
F. D. Richardson, do	150	150
Mrs. Leblanc, do	49	54
L. & E. Provost, do	24	28
Philémon Provost do	45	53
Godfroy Provost do	95	110
H. Sinnetière et L. Verret, do	42	50
Ursin Provost & Co., do	92	110
Estate D. Weeks, Island	758	800
Daniel Rowls, Prairie	144	170
Leufroy Bonvillain, do	71	80
Octave Delahoussaye, do	235	258
Dr. Killgore, do	142	170

STATEMENT—Continued.

Names of planters and parishes.		Actual hogsheads.	No. of 1,000 lbs. net.
St. Mary—Continued.			
ATTAKAPAS—ABOVE FRANKLIN.			
Charles Grevenberg,	Bayou Têche	745	920
Théodore Faye, 118 burnt,	do	134	150
Martial Sorrel,	do	786	840
Charles Pécot,	do	91	108
G. L. Fuselier,	do	373	490
Grégoire Bodin,	Prairie	68	78
Simon Bodin,	do	46	52
Edouard Sigur,	do	131	165
Laurent Sigur,	do	32	36
J. & N. Sigur,	do	166	195
Mrs. Dejan,	do	66	74
J. A. & A. Frère, 84 burnt,	Bayou Têche	455	555
Mrs. Armeling & Son,	do	93	102
Bernard et Fuselier,	do	109	120
Estate John Dehart,	do	134	150
Henry Foote,	do	132	165
Fuselier & Co.,	do	212	222
Mrs. Fuselier fils,	do	189	210
Winthrop S. Harding,	do	65	86
M. R. Freizier,	do	103	112
Stephen Duncan,	do	232	255
Jas. Porter,	do	333	396
Heram Henderson,	do	99	118
Jas. Campbell,	do	48	50
Ursin Perret,	do	102	130
Mrs. Tarkington,	do	32	35
David Bell,	do	16	17
George Elliot,	do	29	31
Mrs. W. Sterling,	do	95	105
Watson McKerall,	do	69	75
J. B. Murphy,	Prairie	106	116
John Parkinson,	do	66	72
Estate J. E. Bowles,	Têche, below Franklin	55	60
Estate M. Bowles,	do	51	55
Théodule Carlin,	do	55	60
Euphrasie Carlin,	do	69	64
Honoré Carlin,	do	73	80

STATEMENT—Continued.

Names of planters and parishes.		Actual hogsheads.	No. of 1,000 lbs. net.
St. Mary—Continued.			
ATTAKAPAS—ABOVE FRANKLIN.			
Col. H. M. Bayliss,	Téche, below Franklin	56	60
Bedell & Hayes,	do	107	130
John Moore & Co.,	do	80	88
Adélard Démaret,	do	29	32
Martin Démaret,	do	66	72
Dr. Harris,	do	116	128
H. Crawford,	do	46	51
Ulger Seinnett,	do	35	35
Mrs. C. Ferguson,	Bayou Salée	40	42
Mrs. Rogers,	do	76	84
Mrs. Necklison,	do	19	20
J. E. Lacy,	do	37	34
Désiré Carlin,	do	90	98
Adelard Carlin,	do	128	140
Placide Carlin,	do	45	44
Mrs. Huggins,	do	72	80
David Berwick,	do	96	105
John Merriman,	do	55	60
Mrs. E Kemper,	do	20	22
Léon Verdun,	do	18	22
John J. Garrett,	do	100	100
Wm. S. Gordy,	do	28	32
C. M. Vinson,	do	122	140
John Rice,	do	220	300
Ben. Hudson,	do	253	275
Nathan Berwick,	do	121	132
Grimble & Callahan,	do	162	178
Michael Gordy,	do	131	144
Allen & Garrett,	do	27	30
Wm. Sharp,	do	85	93
Wm. Pumphrey,	Bayou Têche	126	138
Romeo Verdun,	do	67	80
George Sennett,	do	72	86
Francis Dancy,	do	252	276
D. P. Sparks,	do	202	235
Joshua Baker,	do	303	345
W. J. Palfrey & Co.,	do	152	170

STATEMENT—Continued.

Names of planters and parishes.		Actual hogsheads.	No. of 1,000 lbs. net.
St. Mary—Continued.			
ATTAKAPAS—BELOW FRANKLIN.			
P. C. Bethell,	Bayou Têche - - -	214	254
John Smith,	do - - -	208	236
O. & N. Corney,	do - - -	210	268
Estate N. Gerbeau,	do - - -	126	145
C. M. Charpentier,	do - - -	109	128
Mathew Rogers,	do - - -	111	120
J. W. Bowles,	do - - -	121	135
Richard Linch,	Atchafalaya - - -	124	138
W. J. Nash,	do - - -	115	128
J. M. Muggah,	do - - -	50	53
Estate Muggah,	do - - -	45	47
A. M. Stanley,	do - - -	46	44
M. Hartman,	do - - -	40	43
David Robbins,	do - - -	81	90
George Haydel,	do - - -	272	288
Mrs. Thériot,	do - - -	35	34
Louis Daigle,	do - - -	22	24
Antoine Comont,	do - - -	52	65
H. M. Carroll,	do - - -	51	56
J. M. Bateman,	do - - -	86	90
Anthony Hartman,	do - - -	30	30
Jacob Hartman,	do - - -	30	30
Valsin Ranthrop,	do - - -	78	78
Mrs. Cochrane,	do - - -	92	102
H. Knight & Son,	do - - -	145	158
Joseph Knight,	do - - -	27	30
Henry Bradley, Grand Lake	- - -	132	160
Mrs. Renthrop,	Berwick's Bay - - -	292	350
Dr. Brashear, (80 burnt,)	do - - -	95	115
Joseph Berwick,	do - - -	97	118
R. B. Brashear,	do - - -	332	370
Dr. Tarleton, Belle Isle	- - - -	121	135
J. G. Sanders,	Bayou Bœuf, - - -	56	64
C. G. & A. Bryant,	do - - -	106	115
J. N. Wafford,	do - - -	142	150
Estate of Collins,	do - - -	32	32
Wm. Rochelle,	do - - -	122	128

57

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
St. Mary—Continued.		
ATTAKAPAS—BELOW FRANKLIN.		
A. Stansberry & Co., Bayou Bœuf - - -	102	110
A. & H. Wallace, do - - -	84	92
E. Stansberry, do - - -	91	100
Auguste Landry, do - - -	33	36
Gautreau & Aucoin, do - - -	21	23
Burris & Campbell, do - - -	71	75
J. G. Willson, Bayou Têche - - -	24	26
J. M. Foote, do - - -	50	53
Théodore Dumesnil, Prairie - - -	45	53
Henry Péna, jr., do - - -	36	38
James Smith, Côte Blanche - - -	272	310
Percy Bray, Bayou Bœuf - - -		
Levy Leblanc, do - - -		
	18,795	21,261
St. Martin.		
ATTAKAPAS.		
John F. Miller - - - - -	162	210
Dr. J. L. Smith - - - - -	258	285
Rosémond Broussard, Prairie - - -	16	18
David Hayes do - - -	241	275
Eloy Derouan do - - -	15	17
Duplessis & Metayer, Bayou Têche - -	100	115
Maximilien Décuir & Sons, do - - -	130	130
Armand Broussard, do - - -	25	27
Jonas F. Marsh, do - - -	120	130
Mrs. E. Broussard & Co., do - - -	78	88
Joseph Gonsoulin, do - - -	9	9
Aurélien Dugast, do - - -	41	51
Joseph Lauro, do - - -	91	100
Camille Broussard, do - - -	146	180
Neuville Déclouet, do - - -	365	350
Drausin Broussard, do - - -	23	25

STATEMENT—Continued.

Names of planters and parishes.		Actual hogsheads.	No. of 1,000 lbs. net.
St. Martin—Continued.			
ATTAKAPAS.			
Mrs. Dubuclet,	Bayou Têche - -	295	365
Despanet Deblanc,	do - - -	83	95
Marin Lenormand,	do - - -	333	396
Ursin Lenormand,	do - - -	132	145
Joseph Landry,	do - - -	83	102
F. D. Chrétien,	do - - -	192	245
A. Déclouet,	do - - -	344	400
Estate of John Palfrey,	do - - -	173	195
Dr. Thomas,	do - - -	127	150
Devalcour, Landry & Co.,	do - - -	86	90
Charles Durand,	do - - -	205	235
E. & D. Dugast,	do - - -	112	125
Térence Bienvenu,	do - - -	40	45
Valery Martin,	do - - -	45	50
Norbert Leblanc,	do - - -	51	55
Charles Lastrape,	do - - -	178	205
John Begnot,	do - - -	20	20
John Micheltre, Bayou Pigeon	- - -	22	25
Godefroy Carlin, Bayou Chêne	- - -	40	40
Ursin Carlin,	do - - -	38	38
		4,419	5,031
Lafayette.			
ATTAKAPAS.			
André Martin	- - - - -	164	180
Jean Bernard & Brother	- - - -	80	88
Valery Veillon	- - - - -	90	100
H. Broussard	- - - - -	38	40
		372	408

STATEMENT—Continued.

Names of planters and parishes.	Actual hogsheads.	No. of 1,000 lbs. net.
Vermillion.		
ATTAKAPAS.		
Arveillon Broussard	29	32
Robert Cade	202	235
Sal. R. Rice	133	140
Notly Young	52	57
McCaskell & Démaret	88	92
Mrs. W. B. Brashear	46	54
Ths. Caldwell	52	58
— Campbell	30	30
John Shaw	10	10
Lloyd Willcoxson	80	80
J. B. Theall	56	56
Stansbury & Stevens	46	50
Robert Perry	38	40
	862	934
St. Landry.		
OPELOUSAS.		
S. W. Wickoff	500	550
Ths. Quirck	132	145
Captain E. Littell	106	115
Wm. F. Hardy	187	210
N. & W. Offutt	106	125
B. R. Rogers	84	90
John Hudson	44	44
Robert Barry	20	22
	1,179	1,301

RECAPITULATION.

Names of parishes.	No. of sugar estates in each parish.	No. by steam power.	No. by horse power.	No. of actual hhds. by each one.	No. of 1,000 lbs. by each one.
Pointe Coupee - -	5	5	-	888	883
West Baton Rouge - -	19	14	5	4,247	4,811
East Baton Rouge - -	18	14	4	4,474	5,026
Iberville - - -	69	47	22	16,463	17,979
Ascension - - -	48	31	17	19,223	20,296
St. James - - -	67	44	23	21,519	22,699
St. John the Baptist - -	55	26	29	13,575	13,820
St. Charles - - -	37	32	5	12,532	12,878
Jefferson - - -	24	23	1	11,218	11,757
St. Bernard - - -	23	18	5	6,941	7,149
Plaquemines - - -	36	32	4	14,761	16,123
Assumption, Bayou Lafourche	62	24	38	11,990	12,878
Lafourche Interior, do -	49	23	26	14,205	14,878
Terrebonne, do -	42	32	10	12,661	13,801
St. Mary, Attakapas -	147	31	116	18,795	21,261
St. Martin, do -	36	9	27	4,419	5,031
Lafayette, do -	4	-	4	372	408
Vermillion, do -	13	-	13	862	934
St Landry, Opelousas -	8	3	5	1,179	1,301
Divers small parcels made in different sugar houses -	-	-	-	1,000	1,000
Total -	762	408	354	191,324	204,913

Note.—It is to be remarked that the cistern bottoms resulting from this crop have not been re-boiled by the planters as heretofore has been the case; they have been bought up by the refiners at higher rates than the planters could realize by working them over. This item is estimated to be equivalent to 5 per cent. addition to the number of hogsheads of sugar, and would swell the crop to full 200,000 hogsheads.

A large quantity of cane has been sold in the field to make plant for new plantations; a considerable quantity was lost by overflow in the summer, and some for want of fuel to work it.

There has not been the usual quantity of molasses made in proportion to that of sugar, owing probably to the cane having acquired a higher degree of maturity; and it is supposed the average yield has not exceeded 45 gallons per 1,000 lbs. of sugar, or, in round numbers, about 9,000,000 gallons.

It will be observed, from the foregoing statement, that there are in operation in this State 762 sugar mills, of which 408 are worked by steam

engines, and 354 by horse power; the number of planters about 900; some of the smaller estates joining their neighbors in one sugar-house.

There will be a large increase of sugar plantations in this State within the next two years. Preparations are making for full 60 or 70, the low prices of cotton having induced many growers of this staple in the parishes of Pointe Coupee, West Baton Rouge, Iberville, St. Landry, Opelousas, &c., to turn their attention to sugar.

P. A. CHAMPOMIER.

New Orleans, *April* 21, 1845.

When I published the preceding statement of the crop of sugar in Louisiana for the year 1844–'45, I had only in view the one object of obtaining the correct details of the crop, in which I succeeded to my entire satisfaction; but I gave little or no attention to other points connected with the actual condition and future prospects of the culture of cane. It was not until I was making up for publication the details I had connected as to the crop, that it occurred to me to make any remarks on the two points of the number of proprietors of the existing plantations, and the probable number of new ones then just opened, or opening; both of which I was, under the circumstances of the case, compelled to do by a rough and vague estimate, principally founded on information received from others.

Since then, however, I have devoted much time and attention to both these points; and having found by my particular investigation that my previous estimates were very erroneous, I deem it a duty to correct the errors, particularly as my publication has been extensively referred to and quoted as authority through the Union. For the then existing 762 plantations, I estimated there were 900 proprietors: instead of 900, however, I find there were 1,200 on the old plantations, being distinct families, or heads of families, who are the owners of these estates, and principally depending on them—this entirely exclusive of overseers, sugar-makers, engineers, carpenters, coopers, blacksmiths, &c., as well as all other families who are connected with the culture of cane in this State.

My error was still greater in my estimate as to the new plantations. I have as yet completed this investigation only for the following seventeen parishes, for which I give the details, viz:

	Old mills.	New mills.	Total mills.	No. planters.
Pointe Coupée - -	5	32	37	41
West Baton Rouge - -	19	31	50	69
East Baton Rouge - -	18	17	35	52
Iberville - - -	69	41	110	169
Ascension - - -	48	15	63	98
St. James - - -	67	9	76	185
St. John the Baptist - -	55	6	61	143
St. Charles - - -	37	4	41	88
Jefferson - - -	24	4	28	48
Orleans and St. Bernard -	23	2	25	42
Plaquemines - - -	36	7	43	70
Bayou Lafourche—Assumption	62	72	134	206
Lafourche Interior - -	49	39	88	159

Terrebonne - -	- 42	26	68	87
Attakapas, St. Mary -	- 147	31	178	287
St. Martin - -	- 36	31	67	106
	737	367	1104	1850

The statement may be relied on as correct, for not only has it been made out with care and punctual personal investigation, but I have also recorded, and in my possession, the name of every proprietor of each of the above 1,104 old and new sugar plantations in each of the above parishes respectively.

It thus appears that in these 17 parishes there are 367 cotton plantations which have been changed into sugar estates. But even this does not show the full number, as many other small cotton-growers have also abandoned that culture for sugar; but not having the means to erect sugar works themselves, all grind their cane at the mills of their immediate neighbors, and these small estates are not reckoned among the 367 new plantations.

In the three other parishes, Vermillion, Lafayette, and St. Landry, where there were 25 old plantations, I have not investigated the number of new ones, but, from the information I have obtained, there must be 25 to 30, or even more.

In the parishes of Rapides, Avoyelles, Calcassieu, Catahoula, and Concordia, arrangements were being made for more than 200 new sugar plantations, but the most part of them have been suspended, and cotton will be mostly cultivated on them for another season, until the action of Congress respecting the tariff is ascertained. Still there are, however, 70 to 80 that are actually opened and going into operation in those five parishes, and all those who suspended the change of their culture are fully provided already, even at great cost, with seed cane for planting.

Of the above-named new plantations, but a certain number will produce more cane than they will respectively require for replanting this season, and add but a little to the present crop. But a very large number will be in full operation for the next crop of 1846–'47, and all of them for the crop of 1847–'48.

Seventy-two engines for sugar mills have been introduced in the State this year, coming from the manufactories of Pittsburg, Cincinnati, Louisville, New York, Philadelphia, and Richmond: some very costly ones from New York and Philadelphia.

There will not be less than 130 put up this next season—by Pittsburg, 35; Cincinnati, 72; Louisville, 10; New York, 10; Richmond, I know of none; New Orleans, 15.

P. A. CHAMPOMIER.

New Orleans, *November* 24, 1845.

From the Planters' Banner.

THE SUGAR MARKET.

The 1st of September being the commencement of a new commercial year, the New Orleans Price Current, in accordance with custom, takes a

retrospect of the most important business operations of the New Orleans market during the season which has just terminated, and offers some remarks upon the prospects of the opening year. We give the remarks on the sugar market, which must prove highly interesting to our planters:

"In our annual report of first September last we stated, in reference to the then growing crop, that up to that period the prospect was of the most flattering character for its early maturity and unusual abundance, and we have now to remark that the result has well maintained our expectations, as a continuance of highly favorable weather throughout the season enabled our planters to make the largest and best crop ever produced in Louisiana. In regard to the amount of production, we have already given it in a former number, and again avail ourselves of the published statement of Mr. P. A. Champomier, who gives the product of each plantation visited, and the result is 191,324 hogsheads, which Mr. C. estimates to be equal to 204,913,000 pounds. Besides this, Mr. C. states in a note that 'the cistern bottoms resulting from this crop have not been generally re-boiled by the planters, as heretofore has been the case. They have been bought up by the refiners at higher rates than the planters could realize by working them over. This item is estimated to be equivalent to 5 per cent. addition to the number of hogsheads of sugar, and would swell the crop to full 200,000 hogsheads;' so, according to this best available authority, we place the crop of 1844 at 200,000 hogsheads—equal, in round numbers, to about 215,000,000 pounds, and exceeding the crop of 1842 (previously the largest) by 60,000 hogsheads. The first arrival of the new crop was on the 3d October, establishing the early maturity of the cane, the first receipts of the previous year having been on the 22d October. Some few small sales of the earliest arrivals were made at 6 and 6½ cents, but prices soon gave way as the receipts increased, and by the latter part of October the extreme rates were 4½ and 5½ cents. The market continued generally dull, with increasing stocks and declining prices, until the early part of November, when the demand opened with some activity, both for the north and west, at an extreme range of 3½ and 5¾ cents. For more than a month subsequent to this period the market continued irregular, though generally much depressed under a large accumulation of stock, when about the middle of December an active demand again sprung up, principally for shipment to the north, at 3 and 5½ cents. A period of dullness again ensued, and by the 1st January prices were down to 2½ and 5¼ cents extremes on the levee, the market continuing extremely heavy until late in the month, when some speculative movements at the north, based mainly upon the very large deficiency in the crop of Cuba, (said to be about 600,000 boxes, or considerably more than the whole crop of Louisiana,) gave a renewed and more active impulse to the demand, and extensive purchases were made, principally on speculation and for shipment to the north, at 2¾ and 5¼ cents on the levee. At this point, also, large operations were entered into on plantation, and a number of crops were disposed of at prices ranging from 2¾ and 4 cents, the prevailing rate being 3½ cents for fair crops. At the commencement of this demand the market, as regards prices, had reached about the lowest point of the season, and here began the upward impulse, which, with a generally good demand, gradually carried prices up to 5½ and 7 cents on the levee, and 5¾ and 6¼ on plantation, a point which they reached about the middle of April, the great bulk of the crop having passed into second hands some time previous. Here, in consequence of unfavorable advices from the north,

a reaction took place, and the market remained in a very dull state, with gradually declining prices, until the latter part of May, when they had again fallen to $4\frac{1}{2}$ and $6\frac{1}{4}$ cents on the levee, and $5\frac{1}{4}$ and 6 on plantation. From this period excessive dullness prevailed up to the latter part of July, when improved rates at the north directed orders to this market, particularly for the ordinary to fair qualities; and these, acting upon a reduced stock, again produced a reaction in prices, which have since materially advanced, the closing rates being 6 and $7\frac{1}{4}$ cents for fair to strictly prime, the common qualities being all disposed of; and the whole quantity in the State is now estimated not to exceed 2,500 hhds.

"The crop, as above stated, with a stock on hand 1st September last estimated at 2,000 hogsheads, makes a supply of 202,000 hogsheads, the distribution of which may be stated as follows: Exports, including those from Attakapas, equal to 107,000 hogsheads, western States 70,000, domestic consumption of the city and of places in this and neighboring States, furnished in small parcels, of which there is no record, 12,500; taken for refining in the city and State, 10,000; stock now on hand in the State 2,500; total, 202,000 hogsheads. This statement we are persuaded approximates to correctness, though as regards all the items except the first we are left entirely to conjectural estimates, as there are not, nor in the nature of the trade can there be, any positive data for the quantity taken by the west and south. It will be seen that of the amount exported, the Atlantic ports have taken 101,000 hogsheads against 30,000 hogsheads last season.

"In regard to the growing crop, we understand that it is not generally considered as far forward in its progress by some two weeks as it was last year at the same period, a circumstance which may prove of serious detriment, though we are happy to have it in our power to state that from present appearances the promise is flattering for an abundant yield; and should the weather continue of as favorable a character as it was last season, there seems a strong probability that, what with the extension of cultivation and the improved modes of culture and manufacture, the coming crop will be the largest in quantity and best in quality of any yet produced in Louisiana. With all this flattering promise, however, it should be held in remembrance that the cane culture in these latitudes is very precarious, and an early frost or a severe hurricane might blight the present encouraging prospects of the planter to a serious extent. As an evidence of the remarkably fluctuating character of the production, we annex a statement of the crops for a series of years, by which it will be seen that while the crop of 1834 was 100,000 hogsheads, the succeeding one, that of 1835, fell to 30,000; and further, that the last crop exceeds the one immediately preceding it by 100,000 hogsheads:

Crop of 1844	200,000 hogsheads.
1843	100,000
1842	140,000
1841	90,000
1840	87,000
1839	115,000
1838	70,000
1837	65,000
1836	70,000
1835	30,000

Crop of 1834	- - - -	100,000 hogsheads.
1833	- - - -	75,000
1832	- - - -	70,000
1829	- - - -	48,000
1828	- - - -	88,000

"As regards the prospect of prices, it will be borne in mind that the ascertained deficiency in the crop of Cuba was the main cause of the recovery of the market from great depression during the past season; and as the accounts from that island state the growing crop to promise the usual average production, a similar favorable influence from that quarter cannot be expected to operate upon the coming crop of Louisiana. Nevertheless, the extension of consumption in our own country, and the opening of the English markets at a reduced duty, will be likely to protect this important staple from so great a depression as would otherwise be consequent upon a large production."

New Orleans, *March* 1, 1845.

Dear Sir: I do hereby certify that the annexed statement of my last crop made on Myrtle Grove plantation, and which it is your intention to have printed in the report of the Patent Office, is true and correct; and I do further say that your apparatus has exceeded, in all respects, my expectations. I have, in consequence, contracted for another apparatus for another plantation of mine, and with which I intend to make my next crop into loaf sugar.

Very respectfully, yours,

T. J. PACKWOOD.

Mr. N. Rillieux.

N. RILLIEUX'S PATENTED APPARATUS AND PROCESS.

Myrtle Grove estate—Statement of the sugar crop, 1844–'45.

The total crop amounts to 829 hogsheads, to wit: 128 hogsheads obtained by the old set of kettles, and 701 hogsheads by the new apparatus.

The 128 first hogsheads have been sold here, in November and December, 1844, at the average price quoted for fair sugar during the same period in the New Orleans price current. The same average price ought to be taken, in consequence, for the following months, as a correct expression of the prices which the owner of the plantation should have obtained for his sugar. Would he have made his entire crop by the set of kettles, and without using the new apparatus? Such are the prices adopted in the following statements, to establish a fair comparison between the proceeds of the two processes.

The 701 hogsheads by the apparatus are represented by—

177 hogsheads sold at New Orleans in November and December, 1844, and January and February, 1845.

202 shipped for different places, viz:

New York, 10 hogsheads, sold at $6\frac{7}{8}$ cents.

Boston, 10 hogsheads, sold at $6\frac{3}{8}$ cents.
Charleston, 50 hogsheads, sold at $7\frac{3}{4}$ and 8 cents.
Philadelphia, 117 hogsheads—no report.
Liverpool, 15 hogsheads, do.
322 hogsheads yet unsold.

Two per cent. has been reported as the loss in the weight for the above shipments.

The monthly sales made in New Orleans of 128 hogsheads from the set of kettles, and of 177 hogsheads from the apparatus, are as follows:

Sales of sugars.

Time of the sales.	Set of kettles.—(*a*)	Apparatus.—(*b*)	(*a*) Average prices of sales of sugar.*	(*b*) Average prices of sales of sugar.†	Average prices of sugar, *fair*, as per price current.‡
1844 and 1845.			*Cents.*	*Cents.*	*Cents.*
November -	70 hogsheads, = 77,937 lbs., sold for $3,333 28	10 hogsheads, = 12,130 lbs., sold for $782 67	4.28	6.45	4.25
December -	58 " = 64,139 " 2,630 76	60 " = 70,793 " 4,486 73	4.11	6.33	4.13
January -	- - - - -	56 " = 63,629 " 3,720 72	-	5.84	3.68
February -	- - - - -	51 " = 58,543 " 3,566 00	-	6.09	4.00
	128 " = 142,076 " 5,964 04	177 " = 205,095 " 12,556 12			

* General average of the prices of sales of sugar, 4.19 cents.
† General average of the prices of sales of sugar, 6.12 cents.
‡ General average of the sugar, fair, by price current, 4.01 cents.

The proceeds of the crop from 370 acres of cane, to wit, 829 hogsheads of sugar and 361 barrels of molasses, as follows:

	Hogsheads and barrels.	Pounds.	Gallons.	Price.	Total.	
Set of kettles.				Cents.		
87 acres { Sugar - - -	128	142, 130	-	4.19	$5, 964 04	
87 acres { Molasses - - -	221	-	8, 832	18	1, 589 76	
						$7, 553 80
Apparatus.						
283 acres { Sugar, 1st quality -	561	645, 150	-	6	38, 709 00	
283 acres { Sugar, 2d quality -	140	154, 000	-	5	7, 700 00	
283 acres { Molasses - -	262	-	10, 500	18	1, 890 00	
						48, 299 00
						55, 852 80

NOTE.—The molasses obtained by the set of kettles is in the proportion of 69 gallons per hogshead of sugar. By the apparatus this proportion is reduced to 15 gallons. The price quoted at 6 cents for 1st quality (apparatus) sugar, is below the general average of the prices of sales of sugar, (6.12 cents.)

The following averages have been obtained, during the time of the crop, from the same quantity of cane juice:

By the set of kettles—sugar, 1,000 pounds; cistern bottoms, 80 pounds; molasses, 776 pounds.

By the apparatus—sugar, 1st quality, 1,000 pounds; sugar, 2d quality, 280 pounds; molasses, 190 pounds.

From examination of the above average productions and average prices, it must be answered that the proceeds of the whole crop of 1844,–'45, taken off in the two ways, should have been as follows:

By the set of kettles.

	Hogsheads and barrels.	Pounds.	Gallons.	Price.	Total.
				Cents.	
Sugar - - - -	649	721, 130	-	4	$28, 845 00
Cistern bottoms - - -	50	57, 680	-	$2\frac{1}{2}$	1, 442 00
Molasses - - - -	1, 120	-	44, 781	18	8, 060 00
Crop—total amount - - - - - -					38, 347 00
Balance - - - - - -					21, 794 00
					60, 141 00

By the apparatus.

	Hogsheads and barrels.	Pounds.	Gallons.	Price.	Total.
				Cents.	
Sugar, 1st quality - -	697	802,061	-	6	$48,123 00
Sugar, 2d quality - -	176	193,228	-	5	9,661 00
Molasses - - -	328	-	13,095	18	2,357 00
Crop—total amount - - - - -					60,141 00

In the above account the economy of the fuel is not mentioned, though it is an important item; for, by the new process, there is a saving of two-thirds. The apparatus requires, with the feeding of the steam-engine, one cord of wood per hogshead, and the refuse cane is more than sufficient.

The next crop at Myrtle Grove shall be taken off in white sugar in hogsheads, and another apparatus shall work also, but to take off the crop in white loaf sugar at Bellachasse, another plantation, of which T. J. Packwood, esq., is joint owner with T. P. Benjamin, esq.

New Orleans, *March* 1, 1845.

SUGAR CANE--ITS CULTURE IN LOUISIANA.

Mr. L. Tucker: The plants we cut and matlay in beds during the autumn, usually in October, previous to the sugar-making season, and before the canes are injured by frosts. Often the unripe tops, which would otherwise be thrown away, are winrowed for plants. The best plant cane we usually save for plants, because they are the easiest put up and the quickest planted; for time and saving of labor are money. Besides, by plantnig the whole stalk, it grows more vigorously than the tops, especially in a dry season.

After the sugar-making season is over, which usually is about the first of January, we prepare our land designed for cane, by ploughing and harrowing, breaking it from four to eight inches deep; the stiffer the land the deeper the ploughing is necessary to protect it from drought. Thus prepared, the ground is laid off in rows, with a two-horse plough, about six feet apart, (some plant as close as four feet.) In these furrows a double mould-board plough, with one horse, is run, in order to clear the furrows of lumps and sods, and also to deepen and widen the furrows; as it is necessary to put the plants several inches below the surface, otherwise the cane would require too much hilling, especially the second and third years.

The plants are now taken from these mats, and the leaves stripped off, placed in carts, carried and tipped out on the prepared land, and laid lengthwise in the furrows. We plant three canes side-by-side, or triple; some say one and a half is sufficient. The closer the rows, the less each would require. We now pass along with a cane knife, and cut the cane in pieces, say from two to three feet in length, in order that the canes may lie more level, and because more eyes will vegetate. Being thus placed,

they are covered with a plough to the depth required, from one to three inches, over which a light harrow may be passed. Many prefer to cover with the hoe. Soon as the freezes are over in February, the cane is ploughed, running the bar each side the cane, and throwing the furrows from it; the cane, beginning to come up, is scraped, (so called;) if covered too deep, the earth is taken off, usually with a hoe, sometimes with a harrow or other machine, and cleaned from grass and weeds. In a few weeks it is again ploughed and hoed, and again, when necessary, a little earth put to it when required.

The cane by April or May has come up thick in the rows, but usually not so thick but that the stalks, when about a foot and a half or two feet high, send out many new stools or shoots from the bottom of the stalk, and, if they come out early, grow and mature equal to the main stalk. It is usual to give it three or four workings, and in the last to hill the cane three or four inches, and sufficiently high to protect the lower eyes on the stalks from freezing in the winter. Those eyes vegetate next season, and produce nearly equal to the first season on fresh land, and so again the third year, and often longer. Cane is injured by hilling before the stools are sufficiently high, and should receive the last working soon after it is about three feet high, in order to afford more time for ripening. After this period, say in June, it grows very rapidly; the joints begin to appear, and the lower joints begin to ripen—to sweeten; and by the middle of October usually ripen from two to four feet from the bottom, and continue to ripen about a joint (or six inches) a week, till they are cut for the mill, or till the freeze comes; or till they are cut to winrow, in order to secure them from an anticipated freeze. About the middle of October we commence making sugar. Each hand takes a row; first cuts the tops of the stalks off just below the green leaves, and drops them on the ground or lays them in winrow, if designed for plants; then, with the knife, (the blade of which is about 18 inches in length and two inches in breadth,) the dry leaves are stripped from the stalks, and the cane is cut close to the ground; the left hand at the same time has hold of the canes thus cut, and places them in small heaps, convenient for loading into carts, drawn by horses, mules, or oxen. Other hands load the cane, and it is hauled to the mill.

The cane fields are all ditched, usually every acre in width, with cross ditches about every five acres. No water is allowed to remain on the surface. The cultivation is as simple as that of broom corn, and the young shoot far more vigorous.

Cane stalks usually grow from 6 to 9 feet high. The leaves shoot up two or three feet higher. Cane ripens in favorable seasons within 12 or 18 inches of the top. You will perceive we plant one-third of our cane land or crop yearly, two-thirds coming from the ratoons.

S. TILLOTSON.

New River, La., *August*, 1844.

From the Floridian.

FLORIDA SUGAR—LETTER FROM F. P. MILLER.

We have been shown a specimen of sugar manufactured by F. P. Miller, esq., of Jefferson county, (referred to in the letter below,) which is by

far the finest sample of Florida sugar we have ever seen. It is nearly equal in whiteness to the Havana box, and is superior to the sugar brought here from New Orleans. Had we the capital to erect proper works, sugar would soon become no small item in our exports. As it is, however, our planters will soon be able to manufacture not only sufficient for their own use, but to supply the demand of our home markets. The annexed letter from Mr. Miller, which has been kindly furnished us by Gov. Moseley for publication, contains some hints which may be useful to those engaged in the cultivation of the cane. We would respectfully suggest to those of our planters who have had experience in the manufacture of sugar, to communicate the result of their observations to the public. We should be happy to extend the use of our columns to any one who would favor us with articles upon sugar, as well as upon the culture of tobacco, &c.

Jefferson County, *September* 1, 1845.

Dear Sir: In a communication which I received from you a few days since, you requested me to furnish you with an article on the cultivation and manufacture of sugar. I have had some hesitancy in complying with your request, only from the fact that my opinions would possibly differ with some of the farmers of the country, and some, too, of experience. But, after giving the subject due consideration, and thinking I might be of service to some in my communication, I have yielded to your request; and, so far as I am capable of giving my opinions, you shall have them freely. As I am more accustomed to using my farming utensils than wielding the pen, and knowing better how to make sugar than to describe the operation, you must allow me to give my opinions in my own plain way. In the first place, I prefer the ribbon cane for this climate, for the reason that it will stand the cold spells, which we are sometimes subject to in the fall season, much better than the green. I have noticed in some crops that I have made, where my cane has been mixed, that the green cane has soured after a killing frost, when the ribbon cane would be perfectly sweet. This I consider a great advantage, by giving the planter more time to gather in the other products of his farm. The sample of sugar which I send you was made from the ribbon cane after a severe freeze, which I consider a good test of its preference. I have been accustomed to banking my seed cane in low, flat beds, say about four feet deep, with the roots inclined downwards, and leaving them entirely uncovered with earth until after the first frost, or until the blades are entirely dry. The advantage to be gained by this mode of putting up seed cane I consider a great one, from the fact that the cane will remain in a warm, moist state during the winter, and the roots and eyes will not only be perfectly sound by the usual planting time, but will have put forth their sprouts, and secure to the planter an earlier and better stand. The usual mode of banking up seed, by drawing the bed to a narrow ridge on top and covering with earth before the blades are thoroughly dried, causes the cane to heat, and consequently a great many of the sprouts will perish from dry rot.

The kind of soil from which I raised my cane last year is of good quality pine land, about fourteen or fifteen inches deep, of a very light cast, and has been in cultivation several years. Cane should never be planted on first year's ground, from the fact that the juice extracted from it will not granulate. The most favorable time for planting, in my opinion, is

about the middle of February, provided there is a suitable warm spell ; for I consider the cane to be doing much better by remaining in bank, where it will sprout and remain sound, and not exposed to the cold until the earth has become a little warm. My own observation has convinced me that cane planted about this time will grow off faster, be equally as forward, and the stand much better, than when planted earlier. I have usually planted my cane four feet between rows, and very thick in the drill ; a stalk of cane six feet long should lap or be touching. The seed should be planted deep, and covered with a turning plough.

The first working which it receives should be done with the hoe—what is commonly called by the farmers "flat weeding." This will break the crust which may have been formed on the surface of the bed, and forward its coming up. The first ploughing I usually give my cane is with the turning plough ; but after it becomes of any size, I use the sweep. The usual time for laying by is the first of June ; but should it be growing rapidly, I would advise later and deeper ploughing, which will check the growth and cause it to mature better.

It will have been noticed by all who are in the habit of using it, that the saccharine matter is greatly increased after the growth has been checked by the first frost, and until then should never be cut for grinding. I am convinced that a great many of the failures in making sugar are caused from the fact of the cane being topped too high, and consequently a good deal of the juice is extracted from cane that is not matured. The best criterion to be governed by is from the blades drying up, and leaving the stalk exposed only so far as the cane is matured ; and I make it a rule to cut my cane at the joint above the first green blade, by which means you are certain not to have any cane unmatured. I have found a great advantage in cutting my cane and exposing it to the sun about two or three days before grinding. A good deal of the watery particles will evaporate, without any loss of the saccharine matter. The process of boiling will depend a great deal upon the quality of the cane and its maturity. A person would learn more from seeing a few boilings taken off than from all he might hear or read on the subject. In the first place, I would advise the use of lime, which assists a great deal in clarifying, and causes the grain to be much firmer. My plan of using is to mix a half gallon of the cane juice with a half pint of lime ; after setting a while, pour it off. This quantity should be put into a hundred gallons of the cane-juice. It is best not to commence skimming until it is nearly in the act of boiling, at which time most of the scum has risen to the surface, and is much easier taken off. There are so many marks by which the sugar-maker ascertains when his boiling has arrived at the sugar state, that it would be difficult to describe them all. I will give one or two which I consider most certain. It is known by all who have any experience in sugar-making, that as the boiling approaches the sugar state the froth or foam is greatly increased, and the bubbles become much smaller, by constantly dipping up and pouring it off from the cooler. It will be seen that the quantity of liquor or sirup decreases very rapidly after the boiling has turned down ; this should be continued until there is but a small quantity of sirup left, which will be seen in the drainings from the cooler. Another criterion to be governed by, is, when it is ready to be taken off, the bubbles, instead of rising and falling out from the centre, will turn in ; when it should be taken off and put into the cooling vessel as soon as possible.

With regard to the process of dripping, I would say that it is all important to have the molasses well drained from the bottom of the barrels; to effect which, it is necessary to have two or three holes bored in the bottom, into which should be inserted stalks of cane, which will gradually wither and leave the orifice larger at the time when the draining is most needed from the bottom. The hoops should be well loosened after the sugar has been in the barrels a few days.

In conclusion, I would say that I believe as good sugar can be raised here as in any country, from the fact that I have seen samples of sugar made in this country that would compare with the best quality of imported sugar; and, if not cultivated as an article for market, should be made by all the farmers for their own consumption.

Yours, truly,

FRANCIS P. MILLER.

Gov. Wm. D. Moseley.

Consulate of the United States,
Singapore, *December* 17, 1844.

Sir: I am indebted to the kindness of my excellent friend, Francis Markoe, esq., of the Department of State, for a copy of your report on patents, to Congress, at the early part of the present year, which I consider a most valuable work, calculated, as it is, to circulate precious information to the great mass of our people without any expense. As, besides notices of patents, you have embodied useful notes from many experienced persons, I have thought that some account of the Chinese manner of sugar-cane cultivation might be agreeable to you; and, should I be correct in this supposition, you are at liberty to make any use you may think proper of it.

The cane is topped off in the usual manner with us, and the upper end is lopped off until cut quite into the solid part, when the heart or pith of it is yellowish and substantial, in order to produce lateral shoots, and prevent sprouting at the end; the lower leaves are then removed; and, if the tops are gathered on the day of cutting, they are allowed to remain over night in the open field, that the sugary sap may somewhat dry up, and be pervious to the water into which they and others, previously cut, are put to soak for twenty-four hours. This process, they say, prevents destructive insects being engendered. After twenty-four hours soaking in water, the plants, which, for the convenience of handling them, are tied up with cane leaves into bundles of about thirty plants, are laid, standing upright and compactly pressed against one another, in a square hole, about six inches deep, and of any given size; when quite full, the mould at the four sides is raised up to near the height of the mass, and muddy water is then thrown on the top till quite drenched; a layer of cane leaves, mixed with dirt, is now spread on to prevent sudden evaporation of the water. For four or six succeeding days considerable quantities of water are thrown on, but without disturbing the top layer. At the end of that time the top and sides are removed, and the eyes of the cane plants are seen to have sprouted out one-half to a full inch, and they are now carried in baskets to the furrows prepared to receive them. By this treatment not a single

plant is lost, and they are as far advanced as those plants which have been otherwise planted full three weeks before.

Their mode of planting is as deserving of attention, and is thus: their furrows are hardly four inches deep, and in the *afternoons* only they plant into earth made quite fine by being well worked. The prepared plants are carefully laid almost flat, the lower ends only dipping in the ground, leaving the young shoots quite unburied; when, in a week or two, the new plants are observed to shoot up with great vigor. Manure, which has been plentifully prepared by burning the dried cane leaves and weeds gathered in hillocks in various parts of the field, mixed with mould, which is burnt with them, is laid in small quantities on the *buried end*, and not on the whole plant; about a double handful of this manure is laid on each. It is carried very readily in baskets, which are slung to a pole or staff, in the Chinese manner of carrying burdens, across the shoulders, which is familiar to most persons who have seen Chinese prints; and it is wonderful to see the effect produced in a few days: they prefer to lay it on in dry weather. When the plants are a month or six weeks old, and the weather likewise dry, liquid manure, composed of the discharges of the body, the washings of pig-sties, indeed all the odds and ends about the house, (which are carefully collected in tanks,) is carried in the like manner, in pails, and ladled out in small quantities on the young canes. A month later they require weeding, and perhaps burnt manure, a second time; and they are finally moulded and shoed. Owing probably to the usual dampness of this climate, they begin early to strip the canes, and never allow the dead leaves to remain. These are gathered and burnt to manure, as before said. Thus each field is made to provide itself with a plentiful supply of that (to them) indispensable article; for they never allow their ground to remain fallow, nor do they practise rotation of crops. But, by following this simple mode, their plantations far exceed in luxuriance and abundance of canes any thing I ever saw in the whole range of the West Indies, beginning with Barbadoes, down to the fertile plain extending along the whole southern coast of Porto Rico. There are never less than fifteen large Tahiti canes in the stoles, and even thirty. Some skill and considerable practice are required to make the burnt manure good in their estimation; for, unless it be quite black, they think little of it. To effect this, some pieces of stray wood are piled up, set on fire, and then grass or cane-leaves, partly dry, are laid on—then a little earth; as this slowly consumes, some ten or twelve hours later an opening is made at the base of the hillock, and more grass, leaves, and mould are laid on the red-hot ashes, and the pile is made again to assume a conical form; and so on, for a day or two, until a sufficiently large mass of manure is provided, to be at hand when wanted; nor is their process a slow one, as might be imagined; for, although the planted canes are ripe in thirteen months, here, under the equator, one coolee, or laborer, raises two and a half acres of canes. The ratoons ripen in ten months; these are slightly manured with burnt manure. The hoe is their only implement. I have often paused in wonder on seeing the most luxuriant fields standing in sandy ground, apparently without a particle of soil, and made to grow thus by the process above indicated.

The business of growing and manipulating are separate among the Chinese. Here contracts are made by the sugar-mill owners, with the cane-growers, to convey their canes to the mill, manipulate them into

sugar, and pay them at rates varying from one to one and a half Spanish dollars per picul ($133\frac{1}{3}$ pounds English) of sugar in the raw state; that is, with the molasses included made therefrom; the grower receiving a monthly advance of two Spanish dollars for his support, which is retained, with interest, at one per cent. a month, from the proceeds of the sugar made from his canes. The ground may belong to either party, without in any way affecting the contract; but, generally, it belongs to the mill owner. This latter furnishes the means of conveyance. All the implements for manufacture, and the laborers in and about the sugar house, are at his own expense; which is not excessive, as a first-rate boiler (Chinese) is hired for from eight to ten dollars per month, and other laborers, of the same nation, at from three to four dollars, and found in nothing. In fact, all servants are paid wages, and are not found.

The process of boiling is after that of the West Indies, as all the works are carried on by Europeans. But, instead of our copper skimmers, may be seen occasionally, as a substitute, a sort of sieve, with a long handle, and ladles, made in a conical form, from the bark of a palm, sago, or cocoanut tree, which appears to answer their purpose quite as well as the most expensive copper ones. Their manner of putting the sugar from the cooler, quite liquid and hot, into bastard moulds, as the refiners with us call their large earthen moulds, is, I think, a far preferable mode than, as in the West Indies, to allow the sugar to crystallize in the cooler, and put it into large hogsheads on the following morning. The Chinese make much less molasses, and the sugar has a larger and brighter grain, by their process. Two strikes are usually run into the cooler, when, on being stirred two or three times, it is allowed to crystallize, which it does in a very short time; and the next day but one, when quite cool, the cones are reversed on a table, the cane stoppers or corks are removed, a small quantity of water is poured into the vent, now open, to facilitate the separation, and, in a minute afterwards, the cone or mould is lifted up, leaving a perfect loaf of hard sugar, which is broken up, and carried and put in draining cases, under which are laid troughs, which convey the molasses into vessels disposed at their lower end to receive it.

The Chinese are said to be a people without *genius*, and I am strongly inclined to that opinion; but, instead of flights of fancy, or of the imagination, they have that which *works* quite as well—a great deal of shrewdness and observation, based on good sense; and we have much to learn from them.

I shall be very happy to receive future numbers of your valuable reports, through the friend I have before indicated, and, indeed, as many papers on southern agriculture as you may wish to get rid of; for much of my time and attention are given to that subject. If I can be agreeable to you in any way, in this distant country, I pray you to indicate the manner, and command me. I think we have met formerly; but time and distance, as they increase, obliterate much of our earlier recollections.

I have the honor to be, sir, your most obedient servant,

J. BALESTIER.

Hon. H. L. Ellsworth,
Commissioner Patent Office, Washington.

MAPLE SUGAR—A NEW ELEMENT.

To the Editor of the Tribune:—We are just through our annual sugar season, and all feel satisfied. The crop is large, very large—more than in any year for some time. Every farmer has enough, and many have made one, two, or three tons.

Arrangements have been made to give more particular statistics of the amount. It is becoming of great importance to the State, and more interest is taken in improving the quality. But my object at this time is merely to call the attention of scientific men to the nature of a substance found in the sugar. The sugar-makers have always noticed that a kind of *grit* settles in the sugar and molasses after it is made. This varies greatly in quantity in different years. The present year the quantity is large. When the sugar was manufactured chiefly in the woods, it was supposed to be ashes or dirt, deposited during the process of evaporation; but the quantity is the same when the sap is evaporated in the house, and cleansed with the greatest care. From a small quantity (perhaps 50 lbs.) I obtained nearly a gill of this substance. When tasted with the sugar, it simply appears like sand; but upon dissolving the sugar, and repeatedly washing it with water, I obtained a substance nearly white, and with a *very pungent, alkaline taste.*

The presence of ammonia in sugar is mentioned by Liebig and Johnston, in their works upon agricultural chemistry; but, if I understand their remarks upon the subject, they refer only to a gas which arises during the process of evaporation. But here is a tangible salt, and of sufficient quantity to be of some interest.

Will some one, through your paper, give an account of the nature of the substance, and thus satisfy the curiosity of many of your readers, and perhaps add a new fact to the researches of science?

WINDSOR CO., VERMONT, *April*, 1845.

MAPLE SUGAR.

As most persons who have not informed themselves on the subject imagine that we are indebted to cane sugar for our main supply, and that maple sugar is a petty neighborhood matter, not worth the figures employed to represent it, we propose to spend some space in stating the truth on this matter. We will exhibit, 1st, the amount produced; 2d, the proper way of manufacturing it; 3d, the proper treatment of the sugar-tree groves.

We shall confine our statistics to the most important northern and western States.

1. New York produces annually	10,048,109 lbs.
2. Ohio	6,363,386 "
3. Vermont	4,647,934 "
4. Indiana	3,727,795 "
5. Pennsylvania	2,265,755 "
6. New Hampshire	1,162,368 "
7. Virginia	1,541,833 "

8. Kentucky - - - - - -	1,377,835 lbs.
9. Michigan - - - - - -	1,329,784 "
Total of nine States -	22,464,799
Residue thus: Add for Maine, Massachusetts, Connecticut, Maryland, Tennessee, Illinois, Iowa, Missouri, and Wisconsin - - - - -	2,030,853
	24,495,652 lbs.

Something should be subtracted for beet root and cornstalk sugar. But, on the other hand, the statistics are so much below the truth on maple sugar, that the deficiency may be set off against beet root and cornstalk sugar. That the figures do not more than represent the amount of *maple sugar* produced in these States, may be presumed from one case. Indiana is set down at 3,727,795 lbs.; but in the four counties of Washington, Warrick, Posey, and Harrison, no account seems to have been taken of this article. In Marion county, four of the first sugar-making townships, Warren, Lawrence, Centre, and Franklin, are not reckoned. If we suppose these four townships to average as much as the others in Marion county, they produced 77,648 lbs.; and instead of putting Marion county down at 97,064 lbs., it should be 174,712 lbs. It is apparent, from this case, that in Indiana the estimate is far below the truth; and if it is half as much so in the other eight States enumerated,* then 22,464,799 lbs. is not more than a fair expression of the *maple sugar* alone.

Louisiana is the first sugar growing State in the Union. Her produce, by the statistics of 1840, was 119,947,720, or nearly 120,000,000 lbs. The States of Mississippi, Alabama, Georgia, South Carolina, and Florida, together, add only 645,281 lbs. more.

Cane sugar in the United States - - -	120,593,001 lbs.
Maple sugar in the United States - - -	24,495,652 "

Thus about one-sixth of the sugar made annually in the United States is made from the maple tree.† It is to be remembered, too, that in Lou-

---

* Dr. J. C. Jackson puts Vermont at 6,000,000 lbs. per annum, while the census only gives about 4,000,000.

† The data of these calculations, it must be confessed, are *very* uncertain; and conclusions drawn from them as to the relative amounts of sugar produced in different States are to be regarded, at the very best, as problematical. We extract the following remarks from an article in the Western Literary Journal, from the pen of Charles Cist, an able statistical writer:

"It is not my purpose to go into an extended notice of the errors in the statistics connected with the census of 1840. A few examples will serve to show their character and extent. In the article of hemp, Ohio is stated to produce 9,080 tons, and Indiana 8,605 tons, either equal nearly to the product of Kentucky, which is reported at 9,992 tons, and almost equal, when united, to Missouri, to which 18 010 tons are given as the aggregate. Virginia is stated to raise 25,594 tons, almost equal to both Kentucky and Missouri, which are given as above at 28,002 tons. Now the indisputable fact is, that Kentucky and Missouri produce more hemp than all the rest of the United States, and ten times as much as either Ohio, Indiana, or Virginia, which three States are made to raise 50 per centum more than those two great hemp-producing States.

"The sugar of Louisiana is given at 119,947,720 lbs., equal to 120,000 hhds.; 160 per cent. more than has been published in New Orleans as the highest product of the five consecutive years, including and preceding 1840.

"But what is this to the wholesale figure-dealing which returns 3,160,949 tons of hay as the product of New York for that article—a quantity sufficient to winter all the horses and mules in the United States!

"Other errors of great magnitude might be pointed out; such as making the tobacco product of Virginia 11,000 hhds., when her inspection records show 55,000 hhds. thrown into market as the

isiana it is *the* staple, while at the north maple sugar has never been manufactured with any considerable skill, or regarded as a regular crop, but only a temporary device of economy. Now it only needs to be understood that maple sugar may be made so as to have the flavor of the best cane sugar, and that it may, at a trifling expense, be refined to white sugar, and the manufacture of it will become more general, more skilful, and may, in a little time, entirely supersede the necessity of importing cane sugar. Indiana stands fourth in the rank of maple sugar-making States. Her annual product is at least *four million pounds*, which, at 6 cents a pound, amounts to $160,000 per annum. A little exertion would quickly run up the annual value of our home-made sugar to half a million of dollars.

Maple sugar now only brings about two thirds the price of New Orleans. The fault is in the manufacturing of it. The saccharine principle of the *cane and tree are exactly the same.* If the same care were employed in their manufacture, they would be undistinguishable, and maple sugar would be as saleable as New Orleans, and, if afforded at a less price, might supplant it in the market. The average quantity of sugar consumed in England by each individual is about 30 lbs. per annum. Marion county contains about 20,000 inhabitants. At 30 lbs. per head, the sugar consumed annually is not less than 600,000 lbs., and for the whole State 24,000,000 lbs., reckoning the population at 800,000. There is annually produced in this county about 175,000 lbs. of sugar; leaving about 425,000 lbs. to be purchased, which, at an average of *five* cents per lb., amounts for this single county to $21,250, a sum well worth saving, and, by a little attention to the making of domestic sugar, very easily saved.

II. MAPLE SUGAR MAKING.

1. Greater care must be taken in collecting the sap. Old and half decayed wooden troughs, with a liberal infusion of leaves, dirt, &c., impart great impurity to the water. Rain-water, decayed vegetable matter, &c., add *chemical* ingredients to the sap, is troublesome to extract, and injures the quality if not removed. The expense of clean vessels may be a little more, but with care it could be more than made up in the quality of the sugar. Many are now using earthen crocks. These are cheap, easily cleaned, and every way desirable, with the single exception of breakage. But if wooden troughs are used, let them be kept scrupulously clean.

2. The kettles should be scoured thoroughly before use, and kept constantly clean. If rusty, or foul, or coated with burnt sugar, neither the color nor flavor can be perfect. Vinegar and sand have been used by experienced sugar-makers to scour the kettles with. It is best to have at least three to a range.

All vegetable juices contain *acids*, and acids resist the process of crystallization.

---

crop of that year. Who believes that 12,233 lbs. of pitch, rosin, and turpentine, or the tenth part of that quantity, were manufactured in Louisiana in 1840, or that New York produced 10,093,991 lbs. of maple sugar in a single year, or twenty such statements equally absurd, which I might take from the returns?"

Mr. Cist will find, in the appendix to Dr. Jackson's Final Report on the Geology of New Hampshire, a statement that Vermont makes 6,000,000 lbs. of sugar annually. If this be so, we may, without extravagance, suppose that New York reaches 10,000,000 lbs. So far as we have collateral means of judging, the amount of maple sugar is *under*-stated in the census of 1840.

Dr. J. C. Jackson* directs one *measured ounce* (one-fourth of a gill) of pure lime-water to be added to every gallon of sap. This neutralizes the acid, and not only facilitates the granulation, but gives sugar in a free state, now too generally acid and deliquescent, besides being charged with salts of the oxide of iron, insomuch that it ordinarily strikes a black color with tea.

The process of making a pure white sugar is simple and unexpensive. The lime added to the sap, combining with the peculiar acid of the maple, forms a neutral salt; this salt is found to be easily soluble in alcohol. Dr. Jackson recommends the following process: Procure sheet-iron *cones*, with an aperture at the small end or apex; let it be coated with white lead and boiled linseed oil, and thoroughly dried, so that no part can come off. [We do not know why earthen cones, unglazed and painted, would not answer equally well, besides being much cheaper.] Let the sugar be put into these cones, stopping the hole in the lower end until it is entirely cool. Then remove the stopper, and pour upon the base a quantity of strong whiskey or fourth-proof rum;† allow this to filtrate through until the sugar is white. When the loaf is dried it will be pure white sugar, with the exception of the alcohol. To get rid of this, dissolve the sugar in pure boiling hot water, and let it evaporate until it is dense enough to crystallize. Then put it again into the cone moulds and let it harden. The dribblets which come away from the cone while the whiskey is draining may be used for making vinegar. It is sometimes the case that whiskey would, if freely used in a sugar camp, go off in a wrong direction, benefiting neither the sugar nor the sugar-maker. If, on this account, any prefer another mode, let them make a *saturated* solution of loaf sugar, and pour it, in place of the whiskey, upon the base of the cones. Although the sugar will not be quite as white, the *drainings* will form an excellent molasses, whereas the drainings by the former method are good only for vinegar.

III. CARE OF SUGAR ORCHARDS.

It is grievous to witness the waste committed upon valuable groves of sugar trees. If the special object was to destroy them, it could hardly be better reached than by the methods now employed. The holes are carelessly made, and often the abominable practice is seen of cutting channels in the tree with an axe. The man who will murder his trees in this tomahawk and scalping-knife manner, is just the man that Æsop meant when he made the fable of a fellow who killed his goose to get at once all the golden eggs. With good care, and allowing them occasionally a year of rest, a sugar grove may last for centuries.

1. As soon as possible get your sugar grove laid down to grass, clear out under-brush, thin out timber and useless trees. Trees in open land make about *six pounds* of sugar, and forest trees only about *four* pounds, to the season. As the maple is peculiarly rich in potash, (four fifths of potash exported is made from sugar maple,) it is evident that it requires

---

* Appendix to Final Report on the Geology and Mineralogy of New Hampshire, page 361. This admirable report is an able exposition of the benefit of public State surveys.

† If those who drink whiskey would pour it on the sugar in the refining cones, instead of upon sugar in tumblers, it would refine *them* as much as it does the sugar, performing two valuable processes at once.

that substance in the soil. Upon this account we should advise a liberal use of wood ashes upon the soil of sugar groves.

2. *Tapping trees.*—Two taps are usually enough—never more than three; for though as many as 24 have been inserted at once without killing the tree, regard ought to be had to the use of the tree through a long series of years. At first, bore about two inches; after ten or twelve days remove the tap, and go one or two inches deeper. By this method more sap will be obtained than by going down to the colored wood at first. I state, upon the authority of Wm. Tripure, a Shaker, of Canterbury, N. H., that about 7 lbs. of sugar may be made from a barrel of 20 gallons, or 4 lbs. the tree for forest trees; and two men and one boy will tend a thousand trees, making 4,000 lbs. of sugar.

3. We would recommend the setting of pasture lands and roadsides of the farm with sugar maple trees. Their growth is rapid, and no tree combines more valuable properties. It is a beautiful shade tree; it is excellent for fuel; it is much used for manufacturing purposes; its ashes are valuable for potash, and its sap is rich in sugar. There are 27 species of the maple known; 12 of them are indigenous to this continent. All of these have a saccharine sap, but only two to a degree sufficient for practical purposes, viz: *acer saccharinum*, or the common sugar maple, and *acer nigrum*, or the *black* sugar maple. The sap of these contains about half as much sugar as the juice of the sugar-cane. One gallon of pasture maple sap contains, on an average, 3,451 grains of sugar; and one gallon of cane-juice, (in Jamaica,) on an average, yields 7,000 grains of sugar.

But the cane is subject to the necessity of annual and careful cultivation, and its manufacture is comparatively expensive and difficult. Whereas the maple is a permanent tree; requires no cultivation; may be raised on the borders of farms without taking up ground, and its sap is easily convertible into sugar, and, if carefully made, into sugar as good as cane sugar can be. Add to the above considerations that the sugar-making period with us is a time of comparative leisure with the farmer, and the motives for attention to this subject of domestic sugar-making seem to be complete.

From the Cultivator.

MAKING SUGAR FROM CORNSTALKS.

A short time since, I met with Mr. Adams's account of his experiment in manufacturing cornstalk sugar, undertaken from the inducements offered by the New York State Agricultural Society, and for which they awarded him a premium of one hundred dollars. I was much interested in its perusal, as it strongly reminded me of the difficulties and discouragements experienced in the earlier stages of the same inquiry, when experiment was the only available source of knowledge to which we could turn for assistance in our exertions. As I have pursued this subject with unabated confidence and reasonable success, since its commencement, my experience may perhaps be useful to Mr. Adams and others engaged in perfecting this important and interesting manufacture.

Before proceeding further, I must find a little fault with your agricultu-

ral society. Its premium was offered for the "maximum quantity of sugar made from an acre of northern corn." It appears to me that the great object to attain is a plan by which sugar may be made *profitably.* It is very possible to expend more labor in the manufacture than the article would be worth; such a plan would of course be worthless practically, whatever might be the *amount* produced. Secondly, in planting corn for sugar, I should prefer seed that had ripened in a more southern latitude, as less liable to run to ear early in the season. In raising this crop, the great end to secure is the perfect growth of the plant in every particular, except in the formation of its seed. No plan ever yet tried has succeeded completely in effecting this object. Those stalks which, from some cause yet unknown, have shown no disposition to form grain, are always far more juicy, and yield a much larger quantity of sugar than those from which the ear has been removed. As soon as this hitherto accidental condition of the plant is brought, by persevering efforts, within our control, I confidently expect that the cornstalk will not merely rival but exceed the sugar-cane in the amount of saccharine matter it will yield. The past season, a small lot of corn was planted in rows, three feet apart, and about six inches asunder in the row. As soon as the tassels appeared they were pulled out. The result of this experiment was encouraging, but not entirely satisfactory; another lot of corn, growing within one hundred yards, was allowed to tassel, and this perhaps caused the partial failure. In order to try this plan fairly, the corn should be grown distant from any other, and the tassels pulled out before any of their pollen has been shed. Very thick planting, in order to prevent earing, is objectionable, as it renders the crop more liable to be prostrated by storms; and the stalks being small, the labor of handling them is increased: they should not be less than one inch in diameter, or about the size of broom handles; the distances in planting, in order to produce this size, will vary according to the quality of the soil. Whatever plan is adopted to prevent earing, it must be attended to, or the sugar of the stalk will be expended in the formation of grain.

When the corn is ripe—which will happen about the usual time of cutting corn—cut off the tops at the point where the ear generally forms; the leaves on the stalk below this are few in number and mostly dead; they may be sufficiently removed by simply passing the knife from top to bottom on each side of the stalk. By pursuing this plan, the formidable labor of stripping the stalks, which has been complained of, is greatly lessened, and the whole business put in a practicable shape.

The method of curing "tops and blades" is so well understood by farmers, that nothing need be said about it here. Experience has proved that the extras of this crop—the tops, blades, crushed stalks, &c.—are worth more, when properly secured, than the whole labor required in growing and manufacturing, provided this labor is economised in the way pointed out. In the list of plants cultivated for forage, there is not in the whole world another one that is equal to this in the amount of nutriment which it contains. It is well worth cultivating for the fodder alone; the stalks therefore cost nothing. Every farmer may see, from this, (if he chooses) how to steer clear from his grocery bill.

The mill for grinding, best suited for the farmer, is a simple one, and need not cost more than $10.

The boiling apparatus should consist, first, of two defecating kettles;

they may be of cast iron, and capable of holding as much juice as the mill will press out in fifteen or twenty minutes; these kettles must be placed so that a quick and strong fire can be made under them, and so arranged that they can be emptied at a moment's warning. Second: two or three evaporating pans; a single sheet of Russia iron, bent up six inches at the sides and ends, and riveted, makes an excellent pan of this description. Third: two copper or tin pans for finishing; these should be flat bottomed, six inches deep, and so arranged that they can be removed from the fire instantly when the charge is finished. They should never have much over two inches in depth of sirup placed in them at one time, and should each be of such a size that a charge of three or four gallons will not fill it deeper than this.

The difficulty of manufacturing sugar to the *best advantage* has always been considerable. This has grown out of the foreign substances always found connected with it in the juices of plants. Sugar is one of the most easily decomposed substances in nature. The juice of a plant may be very rich in sugar, yet, when slowly evaporated, the residue will not show a single trace of saccharine. In the process of vegetation, as the plant approaches maturity, sugar is changed into starch. In the germination of the seed a contrary change occurs, and starch is converted into sugar. I took a portion of sprouted corn and macerated it in water until the sugar was extracted; the liquid then strikingly resembled, both in taste and smell, the juice of cornstalk after it had been clarified; it was then set to evaporate over a slow fire; it gradually grew darker in color, and in a short time it appeared very much like beet-juice. Before the evaporation was finished every particle of sugar had disappeared, and, from being sweet and pleasant to the taste, it had become black, bitter, and nauseous. The same experiment was repeated under the same circumstances, except that a small portion of starch was added to the water; in this case the sugar was not decomposed, but retained its distinctive qualities throughout evaporation. The chemical reasons for this it is needless now to discuss; the simple fact, and its application, are sufficient for our purpose. Wheat flour consists principally of starch, and was used with good success, though perhaps pure starch would be better. One pint of flour was mixed with two gallons of skim-milk, and one pint of this mixture was added to thirty gallons of juice. These proportions are not given as best, for many more experiments will be necessary before they can be determined accurately.

As the juice comes from the mill, it should run into a receiver which will hold just enough to fill one of the defecating kettles; while in this receiver the mixture of flour and milk, and also the necessary quantity of lime water, must be added and well stirred in. It is then poured at once into the defecating kettle and heat applied; a very firm thick scum is by this means separated, and the juice becomes clear; it is next run through a flannel strainer into one of the evaporating pans, and the boiling kept up briskly. Take a shovelful of red-hot coals from the furnace, and, after blowing the ashes off, throw them into the pan; as you put in more juice, add more coal; as the pan becomes filled with coal, take out that which has been in longest. From this pan the juice is run in succession through the others, (straining it when convenient,) until it is finished.

WM. WEBB.

Wilmington, Del., *March* 14, 1845.

From the Cultivator.

CORNSTALK SUGAR AND MOLASSES.

Mr. Tucker: An opportunity offering, I am induced to send you samples of sugar and molasses from the juice of cornstalks. It is now about seven weeks since this was pressed and boiled. You will perceive that granulation and drainage are tolerably perfect. 688 pounds of the crystallizable sirup was made from one measured acre; and, had it not been for some loss sustained at the first boiling, I believe the amount would have been 700 pounds. Over 100 pounds per day were made at four successive boilings.

I believe it is in the power of any farmer to make abundance of sugar and molasses for his own use. The apparatus is simple, and within the reach of almost every one; all that is needed is a mill to crush the stalks and express the juice, and three common iron kettles, set in a brick arch, for boiling. Neither is there any mystery or difficulty in the process but what a little experience would enable any one to overcome. The principal things to be attended to in the boiling are, to be careful to skim, and get the juice well clarified before it comes to a boil; some milk and flour, as recommended by Mr. Webb in your July number for 1845, facilitates this very much. Some *clear* lime-water is also necessary. We have found that using the cream of lime, or the lime mixed up in the water, prevents the fecculent particles from coming to the surface, and makes it necessary to strain, and occasions much trouble and loss; on the contrary, the *clear* lime-water does not have this effect.

It is also necessary to boil as rapidly as possible; the quality of the article and the crystallization depend altogether on this; and, lastly, it is necessary to know when it is boiled sufficiently to granulate. We have this year boiled without a thermometer, and found no difficulty, by attending to the directions given in statements formerly published and republished in the reports of the Commissioner of Patents.

One of my neighbors has erected a mill, &c., and is at this time engaged in boiling. I believe he will fail to make sugar, but is making a satisfactory article in the way of molasses, and I have no doubt will succeed another year.

Yours respectfully,

JOHN BEAL.

New Harmony, Ia., *October* 14, 1845.

New Harmony, Ia., *December* 22, 1845.

Dear Sir: Yours of the 3d instant reached me by the last mail. I cheerfully comply with your request to furnish you with a statement of my this year's experiment in the growth and manufacture of cornstalk sugar; also, a sample of the sugar. This year's experiment has been still more successful than the last in the quantity per acre, and, I believe, some little improvement in the quality. I planted a measured acre, and the yield was 688 pounds of the crystallizable sirup; and had it not been for some loss sustained at the commencement in trying some new experiments that were unsuccessful, it would have reached 700 pounds. The continued culture of corn for this purpose is now a settled point with me, being well satisfied that it is *here* equally profitable with anything else grown in general. I say in general, for there may be some years when particular articles may be an exception.

In consequence of this opinion, I endeavored, in my last communication to the late Commissioner, to institute a comparison as to the expense of raising corn and sugar. From some errors, either typographical or original, that statement was altogether incorrect, which I will endeavor to correct in the present communication, although, owing to the present high price of corn, it will not contrast so favorably for the sugar. I think it is a fair estimate to value this sirup at 5 cents per pound, seeing that sugar ranges here from 8 to 12 cents, and molasses from 40 to 50 cents per gallon. The cultivation of each, up to the time of pulling of the ears, is the same; the pulling of the ears I offset by the pulling of the corn.

688 pounds of sirup, at 5 cents - - -		$34 40
Deduct, for blading, cutting, and getting stalks to mill,		
1 man, 8 days, at 50 cents per day - - -	$4 00	
Horse, hauling the same 2 days, at 25 cents per day -	50	
Grinding, man and horse 8 days, at 75 cents per day -	6 00	
Boiling, 8 days, at 50 cents per day - - -	4 00	
Fuel - - - - - - -	2 00	
Interest and repairs on fixtures - - -	3 00	
		19 50
Net value of sirup - - - -		14 90
Corn, 50 bushels, at 25 cents per bushel - -	12 50	
Deduct for husking - - - - -	1 00	
Net value of corn - - - -		11 50
Balance in favor of sugar - - -		$3 40

By a reference to the statement of Mr. Tillotson, in the report of the Commissioner for 1843, it will be seen how much the expense may be reduced on a large scale.

It will also be seen by Mr. K.'s statement that his product was 200 gallons of the sirup for the 4 acres, or 50 gallons per acre. By dividing 688 by 12 pounds, (the weight of a gallon of sirup,) it will be seen that my yield was over 57 gallons per acre.

I am by no means satisfied with the drainage. The molasses, though clear and not so high colored as ordinary molasses, is still much thicker, and will not flow freely from the sugar. It generally comes cool weather within a few weeks after the boiling; this is much against the drainage. If it could be kept in a temperature of from 70 to 80 degrees, I think the process would be much accelerated.

A small quantity (about 6 or 7 gallons) was put into a tapering vessel by itself; this was drained in a few weeks, and during the continuance of the warm weather, and the sugar was of better quality than usual. The sugar sent you was from this drainage, but from the bottom of the vessel; therefore, not as fair as the upper portion. Some sugar and molasses have been sent to the editor of the Albany Cultivator, some notice of which has probably been given in the December number of that excellent periodical.

Respectfully yours,

JOHN BEAL.

Hon. Edmund Burke.

APPENDIX No. 14.

From the Cultivator.

CULTURE OF CARROTS AND ONIONS.

Mr. Editor: Having had good success in raising carrots, onions, &c., I have had a desire to make my mode of raising such vegetables public, as it differs in some respects from the modes usually practised in this country. But when I considered I was not well skilled in writing articles for publication, I was led to hesitate, until I reflected that language—the vehicle by which our ideas are communicated—may be compared to the carriage which conveys the produce of the farmer to market; and when I remembered that it matters little whether the carriage is constructed with two, three, four, or even five wheels, so long as the produce is easily, expeditiously, and safely conveyed, it gave me some more confidence. And then, again, I received additional encouragement by some remarks of a correspondent of the Albany Cultivator, who, after speaking of the reading of agricultural papers, says: "This reading gives an opportunity of becoming acquainted with the practical experience of farmers. It is much to be desired that more of this class of farmers could be induced to give their views. There is too frequently a reluctance to writing. This reluctance should be overcome. It is not expected that plain farmers should always frame sentences in the style of *literary* writers, nor is this necessary—give us the *facts* in an intelligible manner." And so I am encouraged to proceed. And to commence, I will state the amount of carrots and onions I obtained, and then some of the means used to obtain so large crops. But, before proceeding, I will remark that I have no doubt that in several respects my mode of management may be improved upon.

Of carrots, I had at the rate of twelve hundred and nine and a half bushels to the acre, large measure, and of onions six hundred and thirty bushels.

The land on which these crops grew—being of a full middling quality as to richness—was ploughed early in the spring, at a time when the ground was in a sufficiently dry* state to pulverize. It was then harrowed several times over; then ploughed a second time, in such a manner as to have no treading of the team upon it. A row of boards to stand upon while sowing the seed was laid down on one side of the ground about to be sowed. With a common hay rake, six or seven feet in breadth was soon made sufficiently level to sow. A line, fastened to two stakes, was stretched to mark the place where the first row was to be sowed. Then, with a common garden hoe, a place near one inch deep was made for the seeds. The onion seeds were then sowed very evenly and expeditiously, with a contrivance which I will hereafter describe, and covered with the hoe. Then the line was moved fifteen inches to mark out the place for the second row. The boards were then moved over the row that had been sowed, so that

---

* As there is often too much moisture in land to plough it early in the spring, and as carrots, onions, and parsnips need to be sowed early, it would doubtless, in many cases, be well to ridge the land up in the fall.

the second row could be dug out, sowed, and covered, as was the first. The line was then moved to mark the third row, and the boards were also moved over the second one, which was already sowed. In this manner I proceeded until the whole was finished, and the ground presented a beautiful level and mellow appearance, as if a light roller had passed over it, without having the appearance of being trodden down, as is often the case where men walk upon the ground. The carrots were sowed in much the same manner as the onions, with the exception that eighteen inches space was allowed for the rows, instead of fifteen. A small quantity of plaster was sowed with the seeds.

When the carrots and onions were up sufficiently high to hoe, I commenced at one end of the rows, and hoed in as far as I could conveniently reach. Two pieces of board, each near three feet long and ten inches wide, were placed in two of the rows I had commenced hoeing, and which I wished to finish. I then stepped on one of the pieces of board, and hoed on as far as I could conveniently reach; then stepped on the other board in the adjoining row, and hoed an equal distance in that row. Then, with my hoe placed against a nail fastened near one end of the board, I moved the board I had just left, about two feet in advance; then stepped on it, and moved the other board in like manner. Then I hoed two feet ahead, moved my boards again, and so proceeded on to the ends of the rows. This process, although not quite as expeditious as without boards, not only left the ground in a very mellow state, but many of the fine lumps were broken which, by the common method of hoeing, would not have been. The land presented, after this process, the appearance of having had a roller passed over it, and I think it was better fitted to withstand a drought than it would have been if left in a rough state.

The onions were hoed three times, and at each time when the ground was in a sufficiently dry state to pulverize. The carrots were hoed in much the same manner as the onions, and, in addition, the ground was loosened up between the rows with a dung-fork just before the tops became so large as to prevent such an operation. The earth was not heaved up with the fork, as is commonly done in preparing beds for sowing, but it was barely loosened by running down the fork and giving it a pry. Some of your readers will perhaps think I am particular in describing my mode of procedure; and to such, if any there are, I would say, it was by attending to the small matters as well as the large, that, under Providence, I was enabled to realize so large a result.

The implement I have referred to for sowing the seeds I will now endeavor to describe. The bottom of an old-fashioned coffeepot was knocked out.* The pyramidal-shaped top was soldered on fast. A hole near one-third of an inch in diameter was made in the extreme end of the top for the seeds to run through. The whole was then inverted, and a handle near two feet long was nailed to one side to hold it by when in use. The seeds about to be sowed were thoroughly mixed with sand that was dry, and had been sifted to free it from lumps, small sticks, &c. On account of its simplicity and cheapness, on account of the even and *sure* manner in which

---

* By-the-by, I do not use coffee, as I deem it (unless in sickness) an unnecessary, and, to many, a hurtful drink.

it distributes the seeds, and on account of its being well adapted for sowing short rows as well as long ones, it is well calculated for extensive use.

I will also describe a simple, cheap, and useful instrument that I used to dig my carrots and parsnips. It was made out of a piece of large sized wagon tire about fifteen inches in length. One end was sharpened, and the other slit down near three and half inches. The part on one side the slit was left straight, to be inserted in the handle. The part on the other side was turned down horizontally, to place the foot upon when the instrument was in use. With one of these implements a man will dig, in a given time, one quarter more of parsnips or carrots than he could with a common spade.

S. S. G.

SANDLAKE, *December*, 1845.

LARGE CROP OF VEGETABLES.

James Robertson, of Windham Centre, New York, informs us that he gathered last year, from one acre and eight rods of land, the following produce:

Ruta-baga	819	bushels.
Sugar beets	134	
Carrots	132	
Total	1,085	

The ruta-baga grew on 122 rods of ground, and the sugar beets and carrots 23 rods each. The turnip ground, which was sod, was ploughed the previous fall, was harrowed well in the spring, and cross-ploughed in June, and fifteen loads of manure from the sheep house spread, and the ground again harrowed well. With a small plough it was then thrown into ridges about seventeen inches apart, and the seed sown about the 10th of June, in drills, and the crop was hoed twice. The beets and carrots grew on ground which the year before was occupied with ruta-baga. It was ploughed deep, and a light coat of sheep manure spread and harrowed in. The crop was sown in drills fourteen inches apart, about the first of May, and was hoed twice.—*Cultivator*.

APPENDIX No. 15.

CRANBERRIES.

From the Yarmouth Register.

PLANTING THE CRANBERRY.

In its wild or natural state, the cranberry is found in wet situations—in boggy grounds, in damp sandy lands, and on the low margins of ponds and streams. It will live and grow in comparatively dry soils; but it will not bear fruit without its roots are immersed in water at all seasons of the year.

Soil and situation.—The first object of the cultivator should be to select the ground for his *cranberry yard.* Every wet situation is not suitable. The soil must either be sand, mud, peat, or a mixture of these. There must be an abundant supply of water at all seasons of the year. If the ground is so situated that it can be flooded during the winter and spring, it is better; but it is not indispensable to success. The ground must be saturated with water, either from springs, running streams, or the drainings from higher land. On the low, sandy margins of ponds the water is not much affected by the season; a sufficient supply of moisture will ascend, because the little spaces between the grains of sand act as so many capillary tubes for the ascent of the water; but when the margin is compact earth or unmixed peat, the dampness will not, on that principle, rise to the surface. In a selection of a situation for his cranberry yard, the cultivator must observe—first, whether the soil is of a loose, porous character, easily permeable to water; and, second, whether there will be an abundant supply of water in the driest seasons. If either of these two requisites is wanting, it will be useless for him to attempt the cultivation of the cranberry.

Planting and culture.—In boggy grounds it is advisable to retain the top sod, and cover the surface with beach-sand, if it can be easily procured; if not, with any sand that does not contain loam or surface soil. Until recently, the common method of setting out the vines was, after the bog was covered with sand, it was marked off in parallel rows, like a field of corn, and sods of vines set from three to four feet apart each way. The usual method now is, to set in drills about two feet apart. The vines are separated, and only two or three upright stalks are set together, and are placed from six to twelve inches apart, lengthwise of the drill. On wet and barren sandy land the expense of setting out the vines is much less than on bogs.

Cuttings from any part of the stem will strike root, and may be used where it is difficult or expensive to procure a sufficient quantity with roots. Where vines cannot be procured, cranberries may be sown. It is not certain but that sowing will ultimately prove to be the cheapest and most expeditious method. We know of but one instance where cranberries were sown. That experiment was successful, and the ground is now thickly set with vines.

The best time for setting vines we are unable to state. The common practice has been to set them at any time, when the weather would admit,

from November to March. The spring we should think was preferable for sowing.

During the first season after they are set, vines frequently put forth numerous runners, four or five feet long. The next year the runners put forth upright bearing stems, which produce cranberries on the third year. The vines do not usually become so thick set as to cover the ground before the fifth year.

Manure is worse than useless, and any vegetable or animal matter that will cause fermentation is injurious. As a general rule, the *more barren* the surface-soil, the *better is it adapted* to the growth of the cranberry. The growth of the grasses in such situations will be feeble, while the cranberry, obtaining its sustenance mainly from water and the atmosphere, grows luxuriantly, and will ultimately *kill out the grasses* and obtain complete possession of the soil.

During the first three years, it is better to pull out the grasses than to wait for the cranberry vines to overcome them. Bushes must be carefully removed as fast as they spring up, because, if suffered to grow, they would do great injury. No other attention is necessary, excepting that good fences must be maintained around the vines to prevent the depredations of herbaceous animals.

Profits.—One bushel of cranberries to the square rod may be considered a good crop from vines that have been set five years, though we could cite particular instances in which three and four bushels have been gathered. Raising cranberries is like every other business in life: if a man judges rightly, is prudent and industrious, he will commonly succeed; but if he depends more on good luck than on good management, in nine cases out of ten he will fail. The cranberry fever is now running high among us, and almost every man you meet exhibits some symptoms of the disease. That fortunes are suddenly to be made by all who embark in this business, we do not believe; but that large profits can be obtained from vines set in good situations, such as are above described, there is no doubt. The experiments of Captain Henry Hall, Hiram Hall, and Peter Hall, of Dennis, of Captain Edward B. Hallett and Edward Thatcher, of this town, and many others that could be named, prove that the raising of cranberries, in good situations, is a profitable business.

We know that some of the opinions which we have given in this article will militate against the theories of a few of our friends; but we cannot help it. We have carefully examined almost every cranberry bog and yard in the county, and have carefully compared the information thus obtained, and we know that our opinions are corroborated and supported by all who have had the largest experience in the business. We do not wish to discourage any from planting vines: far from it. We say, go ahead. All we wish is, to discourage men from running blindfold into a business respecting which all the necessary information can be so easily and readily obtained.

NEW YORK FARMERS' CLUB.

We extract the following from a conversation at the meeting of the Club, as reported in the New York Farmer and Mechanic:

Gen. Chandler.—I present to the Club cranberry plants, (some with their

great crop of fruit on,) at the request of Mr. Sullivan Bates, of Bellingham, Massachusetts. A few years ago he first exhibited this fruit, produced by his new method—transplanting from low grounds to high. His success has been complete: he has gathered from one acre about 400 bushels of cranberries in a season! He plants them, in drills, 20 inches apart; in hills, 7 inches. The soil must be such an one as does not bake.

Chairman.—I took from swamps on Gen. Johnson's place some cranberry plants, and planted them on ground 80 or 100 feet above the swamp; they thrived, and their fruit was so close together that one could hardly put a finger in without touching the cranberries. It is a highly profitable crop. I am of opinion that five hundred dollars might be obtained for a full crop of one acre.

Gen. Chandler.—Mr. Bates will furnish any number of plants to those who desire it.

Mr. Worth.—The cranberry of Russia is larger than that of England; but both of them are scarcely half the size of these cranberries, and of much inferior flavor. Those exhibited here would suit the English and continental markets, and would be sold to any extent.

Chairman.—I planted mine in loamy soil; prepared the earth well about the plants; watered them well; and did not lose ten out of the one hundred and fifty plants.

Gen. Chandler.—And those which I set out last spring lived and flourished.

Mr. Wakeman.—My family have tried Mr. Bates's cranberries, and found them excellent. They are larger than other cranberries.

Dr. Underhill.—The cranberry probably improves in *all* respects by the transfer from marsh to upland. Wild grapes love alluvial, wet positions; but their flavor is not to be compared with those growing in dry soils. The wild grape has a thick skin, hard pulp, large seeds. By culture in dry situations, the skin and seeds become one-half less thick and large, and the pulp almost disappears.

APPENDIX No. 16.

GRAPES, PEACHES, &c.

For the North Carolina Farmer.

BRINKLEYVILLE, HALIFAX CO., N. C.

DEAR SIR: In your first number of the North Carolina Farmer, I see you publish an extract from the American Agriculturist, on the culture of the vine and wine making, &c. While according due merit to that piece, as to many particulars, and while allowing that, as to kind of grapes and mode of making wine, they may do in northern latitudes of our country, I am bold to aver that the system, as such, will not do south, for I have experimented on it without success; and I have known a number of others likewise to have failed, so far as that system is concerned. For instance, the Isabella grapes, after a few years culture in our soil and climate, will rot on the vine, in a majority of seasons, in spite of remedies; and the quantity of sugar will not do to save the wine in our hot climate. Neither will fermentation, without straining, generally succeed.

But, without further remarks on particulars at present, I send you the "New York Farmer and Mechanic," in which my uniformly successful process of wine making, with sugar, is detailed.

I would add, that if brandy is added, (as I make a part of my wine therewith,) a fourth of good spirits is not too much to insure the safety of the wine, as well as to give it a good body, seeing American grapes are not as saccharine as European. Indeed, if vineyard business is pressed in our State, the best use of spirits, (apart from medicine direct,) I consider, is to mix it with grape-juice for wines, and thus render its qualities not of the same fiery, intoxicating nature.

As to kind of vines, I will communicate again for your valuable periodical, if you think best to insert this and the extract named.

In the mean time, yours, with all due respect,

SIDNEY WELLER.

From the Farmer and Mechanic.

VINEYARDS AND TEMPERATE USE OF WINES.

MESSRS. EDITORS: Through a desire of being humbly instrumental in promoting the temperance cause of our country, by discouraging the use of ardent spirits, I was induced to undertake the vineyard business as an incidental agricultural employment, on my plantation, in this part of North Carolina. So far as tried, the experiment has answered my expectation; for, the substitution of unequivocally pure and healthful American wines, I have found, answers all the medicinal purposes of an alcoholic stimulant, where such is required to be used, without the inflaming and insidious use of ardent spirits. My wines in this region are now preferred by many, as a family medicine and for communion occasions, to those of foreign countries, of doubtful purity; and we find that the wines mentioned as blessings in the Holy Scriptures were those of *Palestine*, not *exotic*. This

affords a good hint for Americans no longer to expend millions for foreign wines, when our own soil and management are capable of as good, if not better. Indeed, from the general principle that Providence, in the way of food and medicine, generally supplies, of spontaneous growth, every region of the world most suitable for the inhabitants of such region, we might argue that the very luxuriant growth of the vine in most parts of our country indicated it to be wrong for us to depend on the east for grapes, vines, or wine. Be that as it may, I may be permitted to state—and that from the best information, as I think, on the subject, as well as from twenty years' of experience—that this part of our country is as well calculated, in soil and climate, for vineyards and wine making, as any part of Europe. According to the best accredited information, I have made, I have reason to believe, more wine from an acre, or at rates of more, than has been made in France, or other wine-making countries of Europe. And I am not alone in considering the wine from my vineyards as good as the foreign; for, not only in this region I have this testimony from reliable sources, but from different parts of the country whither I have sent my wines, both north and south. For instance, I lately had a letter from a gentleman in Natchez, Mississippi, saying that my wine was highly approved by gentlemen there. I have exceeded my expectation not only in quality but quantity of wines from my vineyard, and in seeing others embarking in the vineyard cause, and therefore look forward to the time when our country generally may have her supplies of wines at home used, generally, in lieu of ardent spirits. By enlarging year after year, I have now about six acres of vineyard; some vines small yet, but a portion on canopies, or one continued spread of branches and foliage above, and all completely clear beneath, six or eight feet high, except the posts to support the scaffolding. From former yield and ratio of increase, I calculate on upwards of forty barrels of wine the coming vintage. The severe frost on the 8th of April last did not injure my prospects of a grape crop; though most all peaches, pears, and apples, and other fruit, were destroyed.

As North Carolina excelled, according to the last governmental census, in the agricultural product of wine, and as I have reason to believe mine is the most productive vineyard in the State, I hope it will not be deemed presumptuous for me to give to the public, through your columns, a uniformly successful mode with me in making a good, well-keeping, sugared wine. I say sugared, because (a fact owing perhaps to the very luxuriant growth and abundant productiveness of vines in our country) the juice is not so saccharine as in Europe, and the weather is also warmer, so that some ingredient has to be added generally to insure the keeping of the wine.

A safe quantity of sugar is two pounds to the gallon, but more or less according to the kind of grapes, and their ripeness when gathered. The following is an outline of the process:

1. The grapes, gathered and cleaned of all but sound and ripe ones, are mashed, with us, by a machine of two rollers, turned by handles.
2. The mass is then folded in a sheet, within a crib, under a press, and the juice extracted, in the same manner as cider.
3. Over a tub, and on a frame, are placed several folds of woollen blanket, (to be washed or renewed when impervious by sediment,) through which the juice is measurably purified by straining, as it were, into the vessel.
4. Add immediately two pounds or more of sugar per gallon. If want-

ing a very fine costly wine, take the best double-refined loaf sugar, beat up. But the common brown will do for a very good wine, of less delicate flavor.

5. Into a clean wine cask, new or second-hand, fumigated with a sulphur match, put your juice thus prepared, and no further process is needed after putting away your cask, bunged up, into a cool place or a cellar. The wine may be left on the lees, to be drawn off for use when wanted, by a spigot, so high as to be fairly above the lees or settlings; or, without any artificial fining, it may be racked off the following fall or winter, when a gallon or more of settlings from moderate (because strained as above stated, and thus kept from running into the acetous state by too violent) fermentation will be found. My Scuppernong, so much commended abroad, (as by members of the American Institute, according to the statement of Mr. Boswell,) is made precisely as above stated, with the double-refined sugar.

But, to make a dark red wine of colored grapes, after mashing I put the mass into an open-headed cask, covered with a blanket, and let it ferment till the skins, &c., float on the surface, and draw off *that* underneath by a spigot near the bottom of the cask; strain it as above stated, and then put in the sugar, and turn it into the cask, and the after treatment is as that stated before of the wine not fermented with the skins, &c.

If sugar enough be added of good quality, and strained as just stated, there is no danger of the wine running into the acetous fermentation.

A few words as to the temperate use of wine, and I close this communication, now longer than intended when I began it. The Scripture, properly understood, I consider the true criterion of the *proper use* or the *abuse* of any blessing of Heaven; that is, of *temperance* or *intemperance*. The express and implied direction to Timothy, as to wine, may be viewed as a very fair general exposition of the Bible doctrine on the subject.

Timothy was to use a *little* wine for his *stomach's sake* and *infirmities*. Now, a fair implication is, that if his stomach or infirmities had not required it, it would not have been his duty to have had recourse to wine at all. And a fair inference therefrom, and that which accords with the strongest light of experience, is, that to those in perfect health the stimulant of wine is needless; and if anything *needless* be resorted to, it is in danger of becoming *pernicious* at length.

Again, if a well man habitually drinks wine, or any other stimulant, he anticipates every good effect it might have when he becomes sickly or infirm. So, it is a *most wretched policy*, to say the least, for the young and healthy to practise taking wine, or any other stimulant; according to the striking moral in the account that a certain *well* man took *medicine* to become *better*, and, while dying in consequence, dictated his epitaph, viz: "I was *well:* I took *medicine*, and *here* I am."

In haste, yours,

SIDNEY WELLER.

BRINKLEYVILLE, HALIFAX CO., N. C., *June* 22, 1845.

From the Albany Cultivator.

CULTURE OF THE GRAPE.

MR. EDITOR: My plan of a vineyard, after the vines are scaffolded, is, in brief, to have no impediment to a free passage of men, cart, or team

beneath the scaffolding, nor anything seen for several feet high but main stem of vines, and posts; and swine always kept in the vineyard to help to keep the ground clear of grass and weeds. When necessary, I use the harrow, skimmer, plough, or cultivator. And especially, before an expected frost or severe weather to cause the leaves to fall, I scarify the ground; and again, after they fall, I run over the surface with some instrument to incorporate the leaves with the soil, to prevent their blowing away, and to answer in lieu of manuring. Trimming in the summer and early in the fall is good for all vines, (so far as trimming is necessary,) but especially so for the Scuppernong. No danger of bleeding at these times; and these last named vines especially should have plenty of room to expand, say thirty feet apart; not too great a distance when considered that ere long, with good attention, they will form a thick, complete canopy, at that or even greater distance. Other vines, ten feet each way is the common distance. Ten feet also the common distance for all my posts to support the scaffolding.

In haste, yours, &c.,

SIDNEY WELLER.

Brinkleyville, N. C., *June* 6, 1845.

For the American Farmer.

AN OUTLINE OF AN AMERICAN VINEYARD, FROM THE START.

Mr. Editor: The following outline is the result of years of successful experiments:

1. Select the best tested American grapes, particularly such as are found to mature well, whether the vines are young or old; if you wish such as will bear forthwith, take those well rooted, of several years standing in the nursery.

2. Plant in the manner of fruit trees, ten feet each way, except the Scuppernong: twenty feet for them.

Trim in the summer or early in fall, tying up one or two main stems, unchecked in length, to stakes, for a year or so; after which, insert a post, with two cleats nailed each side of the upper square end to hold rails or scantling for making the frame for the outspreading canopy of vines above. After the vines have started over said frame, no more trimming is necessary, except it may be to cut off any straggling branches under the canopy, that all may be kept clear beneath for say six or seven feet high.

3. As to soil, any will do, with proper management. I have the finest of good bearing vines in almost all kinds; from the light sandy to the stiff clayey. And as to strength of soil, there is more danger of having land too rich than too poor, as to the bearing properties of vines. As a general principle, ground that will bring good corn is plenty rich for vines, provided you dig or plough, or both, some depth and width, when the vines set, and put manure or surface soil at the bottom of the opening, and then cover with common earth before planting, that no manure or too rich soil may come in contact with the roots, to endanger their safety in case of a drought the first season after planting.

4. The best mode of keeping up due fertility of soil is this, viz: In connexion with never suffering your vineyard at any time of year to be-

come grassy or weedy, to be particularly careful to scarify the ground; and, after fall frosts, let no leaves or litter from your vines blow off or become incorporated with the soil beneath the canopies. Nature's mode of keeping up and increasing the fertility of woodlands taught me this mode, and the very best, too, of manuring vineyards, or what is more than equivalent thereto.

5. The foregoing is the whole secret of having a first-rate vineyard, the *ripe* fruit of which is the most healthful as well as pleasant, and can be enjoyed for several months in the year; the wines from which are in no danger of adulteration; and, as to a family medicine, according to the voice of experience and of most eminent physicians, the very best single healing one in the Materia Medica; and also an anticipator of disease in sickly places and seasons, when taken temperately—say after dinner.

A few additional little matters, and I close this off-hand, hastily written article.

1. I tie my vines with elm bark, which, being got in spring, is at any season ready when soaked, and outlasts any strings I have ever tried.

2. In a wet season I insert posts, with what we call *jobbers;* that is, a piece of wood say three feet long, sharpened at one end, and a strong peg inserted through the other end for raising it by a stake or crow-bar, when driven into the ground by a maul or beetle. Into the hole made thereby insert your post, say two or more feet deep.

Posts at any time can be renewed, when giving way, by propping up the part of the canopy above. Posts of any lasting wood had better be charred at the little end, so as to stand inversely from the way they did when growing as a tree. According to statements I have read in agricultural periodicals, they will last much longer when thus inverted, or standing, as it were, upside down.

Pardon the hasty and desultory style of this communication, and believe me ever yours, and a hearty well-wisher of all deserved success in your avocation in the best of all arts and sciences, as that of agriculture is the foundation of all the rest.

Yours, &c.,

SIDNEY WELLER.

BRINKLEYVILLE, HALIFAX Co., N, C., *Sept.* 16. 1845.

VINTAGE OF OHIO.

I promised you an account of our vintage. It is over; and after all complaints of the rot, and dropping of fruit, and the lamentations of the hard-working German women, who do most of the work in the vineyard in the summer season, my tenants have cause for gratitude, not complaint. The promise of the crop early in the season was without a parallel. Their expectation was 500 barrels of wine. They have made upwards of 300. The mash was very rich, and the wine promises to be of fine quality. More is said of the quantity of wine raised in this country than is true. The balance of the State, I venture to assert, has not produced an equal quantity. But the cultivation of the vine is fast extending on the Ohio; and one or two years more, and I trust the same remark would not be true of this country.

I am also extending my vineyards. As an inducement to poor Germans,

I will give the result in a single vineyard—that of Tuferbers. It is situated four miles from the city, on Boldface creek. It is a rich, steep, stony hill. It resembles the hill of the Irishman—"So steep, that before you get up on the one side you are half way down on the other." It was a hard bargain to the tenant. To trench, bench, and wall the south side hill, was worth $300 per acre.

* * * * * * * * * *

After three years' trial I parted with him. I then took the present German tenant. He was very poor, but strong and healthy—his wife a match for the wife of my other German tenant, who, when she died, told me "he might just as well have lost his horse." He had also full-grown boys and girls. I made a hard bargain with him. Bound him to trench and bench six acres of the worst ground in three years, and plant it in grapes, and put out fruit trees. I was to have half of the proceeds of all the wine and fruit. Space was allotted to him to raise cabbage and potatoes for his family and pasture. I was careful not to make an attempt to climb the hill for the three years, or go near it, fearful of disappointment. Judge my surprise, at the end of three years, to find six acres handsomely trenched and benched, with their walls and vines in fruit. Peaches and apples were this season a total failure, and he had his grapes only to rely on. This is the only vineyard at which a few Isabella grapes remain. To encourage him and the other vine-dressers, I let them have my share of the wine at a reduced price. For the Catawba, he was to pay 75 cents per gallon; for the Cape Vevay, or Schuylkill Muscadell, 62½ cents per gallon; for the Isabella, 50 cents per gallon. The whole of his enclosure does not exceed thirty-five acres—nine acres of it in grapes. He has sold his wine of this vintage, for cash, for $1,779 41. At the price my share was sold to him, it came to $713 75, and left him, from the vintage, the net sum of $1,065 66. I trust other poor Germans may be excited by his example. The thirty-five acres cost me $630. There were some vineyards in the neighborhood more productive than any one of mine, as they suffered less from late frost and the rot.

N. LONGWORTH.

CINCINNATI, *October* 7, 1845.

From the Indiana Farmer and Gardener.

LONGWORTH'S OHIO GRAPE, &c.

In our last we gave an account of a Herbemont grape at Madison, Indiana, supposed to be identical with Longworth's Ohio. We have received from Mr. Longworth a statement which puts all aback again. We have both grapes in our garden, and hope to be able to compare them the ensuing season.

CINCINNATI, *April* 24, 1845.

To the Editor of the Indiana Farmer and Gardener:

DEAR SIR: Your correspondent, Mr. Morrison, is in error in supposing the Ohio grape and Mr. Fitzhugh's Herbemont the same. The latter grape I obtained from Mr. Herbemont many years since, with samples of

his wine, which were not good. Mr. Fitzhugh, of Madison, sent me a sample of wine made by him from this grape, of fine quality and greatly superior to the samples of Mr. Herbemont, and satisfied me that our climate was more suitable to the cultivation of the grape than South Carolina. The sample of the Herbemont sent by Mr. Fitzhugh was examined by the society and pronounced the Herbemont Madeira. It is a fine table grape, entirely free from the hard pulp common to most American grapes, and superior for wine to the Ohio grape, but the bunches are much smaller. The Ohio grape has borne well with me, in my garden; but at my vineyards, in the High Hills, it bears badly. I have never seen it injured by frost. An account was published a few years since of upwards of three thousand gallons of wine to the acre, made by Herbemont, from his grape. Such statements are ridiculous. He had four or five vines that covered his house and porches. The stalks covered but a few feet of ground, and, so measuring, he had more than 3,000 gallons to the acre. In his vineyard he never raised 200 gallons on an acre. The Catawba grape is a good table grape, though not entirely free from a hard pulp; but as a wine grape, in our climate, I consider it superior to all others—capable of making a wine to rival the best Hock and Champagne wines—and that Major Adlum, in introducing it, has left a mine of wealth to the people of the Ohio.

I make this remark, as a gentleman from the east observed to me a few days since that it was understood I gave the preference to the Isabella. The latter grape succeeds better [at the east] than with us. I deem it a poor table grape, and worthless for wine, and have extirpated it from all my vineyards. With two pounds of sugar to the gallon, it makes a pleasant sweet wine.

Yours, with regard,

N. LONGWORTH.

SELECT AMERICAN GRAPES IN THE BRINKLEYVILLE (NORTH CAROLINA) VINEYARDS.

Our successful experiment of grape culture and wine making is mainly attributable to the system being *American* throughout; and, as to the kinds of grapes, not only, after trial, rejecting foreign, but also such natives as are not profitable in most respects. On canopies supported by posts ten feet each way apart, and all clear beneath, for passage of wind, persons, or teams, might be seen, a month since, a complete spread or sheet of grapes, so thick in many places as to yield at rates of a thousand and more gallons of wine per acre. And now, after having made our barrel of wine a day for some weeks past, and entertaining visitors, sometimes more than twenty a day, the vineyards are very full still, and a stranger might conclude that few grapes had been abstracted, and those only from some vines. But, designing a mere list of most select vines, with a passing remark or two, we proceed at once to enumerate, first, such grapes as are good and profitable in every respect, and from most of which we make not only gallons but barrels of wine annually, of late years.

1. The white Scuppernong, the noble native of our own State; but north of latitude 37½ degrees, of no peculiar excellence.

2. Weller's Halifax, a native of this county, but calculated, so far as we have learned, for any part of our country. Out of a large number of vines from the seed of this grape, one we call the Halifax seedling promises, according to best judges, to be inferior to none in every respect. Its culture is yet limited. Fruit like the Catawba, but sweeter.

3. Vine arbor; so called from its very large leaf, as well as extended growth, and consequent peculiar fitness for arbors.

4. Somerville.

5. North Carolina. This is late in ripening, and its peculiar excellence is for wine, not table use.

6. York Madeira.

7. Fragrant. This delightfully perfumes the air around, when ripe. The above kinds have all large berries, and average the Isabella and Catawba in size, and consequently are not subject to depredations from birds. We have several other fine sorts of like sized grapes. But we proceed to those of intermediate size (or that, say, of buckshot) in our first class, viz:

8. Norton's Virginia seedling, called after the late Dr. Norton, of Richmond, Va. This we find one of the finest in all respects, as for table use, wine making, productiveness, (capable of 2,000 gallons per acre,) and free from rot.

9. Cunningham. This is also a grape from Virginia, most excellent for eating, and with one difficulty only as to wine qualities, viz: on every raceme some small green grapes are interspersed among the ripe ones. But, to obviate this, we omit picking out the green berries, and make the wine in the way the late Mr. Herbemont made his Madeira, or a white wine, from his colored grape; that is, by putting the grapes unmashed under the press, and, after pressing, the ripe grapes only are found mashed by pressing.

10. Woodson, also from Virginia; much later ripening than the Cunningham, and not so good for the table.

11. Lenoir, a grape of a grade smaller berry—among the first of peculiar excellence in ripening here.

In the fine vineyard of Mr. John Carter, near Richmond, Virginia, he showed me, some years since, the Clarence of France, imported by him as *identical* with the Lenoir. If Mr. Carter is not mistaken, this is a foreign grape, only not subject to rotting in our country. The juice is very strong, and, as the late Mr. Herbemont observes, capable of making a good keeping wine, without the addition of either spirits or sugar.

But, omitting further enumeration of excellent grapes of intermediate size, we proceed to the second general class, viz: of some kinds excellent in many respects, but exceptionable on account of propensity to rot, (at least at the south,) smallness of berry, &c., and therefore no dependence on them for a wine crop; though a few of each are retained in the vineyards as a variety of fruit, and in contrast, and for visitors. Among a considerable number of kinds in class second, the following are here noticed:

1. The Catawba, the favorite grape of Mr. Adlum, Georgetown, District of Columbia, and now, I see from agricultural periodicals, mostly cultivated in the northern and middle States. But its proneness to rot on the vines renders it a very uncertain fruit in the south, and the older the vines the worse; so that some, as I learn, in this State and Virginia, have given up vineyard culture in despair of profit, whose principal vines were the Catawba; and,

2. The Isabella; and no effectual remedy have we found for this tan-

talizing casualty, but that of cutting down, in the fall season, most of the vines of these sorts, and grafting on their stocks some of the first general class, as good at least in every respect, and far better as to certainty of a well matured crop. Three years since we procured a kind of Catawba said not to rot. The young vines of what we call Eaton's Catawba, so far, have matured their fruit.

3. Colesvine.
4. Alexander.
5. Constantia, or Vevay. This last is that chiefly cultivated by the Swiss settlers in Indiana. But, however succeeding with them, when the vines are young, at least, it proves here one of the rotting kinds; although it, as well as all just named, produces fine large fruit when happening to mature.

This second class now continued with grapes of intermediate size; as,

6. Herbemont's Madeira. This, as seen in the columns of the "American Farmer," was called the Warren, or Warrenden, ere it received the above name from the late excellent Mr. N. Herbemont, of Columbia, South Carolina, who gave it notoriety. It appears to be of foreign extraction, from the shortness of the vine joints, and especially its proneness to rot. Mr. Herbemont himself calls it a tantalizing grape; because, as he states, just when giving promise of an abundant yield, (once he made at rates of more than 2,000 gallons per acre from it,) its frequent habit is to begin rotting without any assignable cause of too wet or too dry, or the like.

7. Longworth's Ohio. The distinguished agriculturist, Mr. N. Longworth, near Cincinnati, sent me, a few years since, some cuttings of this, by mail, in a newspaper; and, by grafting, I have cultivated it to some extent. But here it is of no peculiar excellence, and, I find, prone to rot, though Mr. L. informed me it had proved a most excellent variety in his locality.

We have procured from nearer and more distant parts of our country a considerable number of other kinds of intermediate sized berry, and exceptionable in some respects; among which I name—

8. Baltimore seedling;
9. Bland's Madeira or red English;
10. White English;
11. Enfield;
12. Hunterville, &c.;

and also several varieties of small berry and small yield, though otherwise fine. Three only of these we add to our list of the 2d class, viz: 13, Wilcox; 14, Guinard's native; 15, the Elsingburg.

We have under trial a large number of seedlings; and of those procured from everywhere we could hear of a good native, and may give the result in due time.

SIDNEY WELLER.

Brinkleyville, Halifax Co., N. C., *Sept.* 15, 1845.

CULTIVATION OF THE GRAPE.

James Locke, florist, of Sing Sing, New York, writes to the New York Farmer and Mechanic, under date of August 4, 1845, as follows:

When you were last at my place, you requested me to send you a written statement of my mode of treating the grape vine. In the first place,

I dig a hole two and a half to three feet deep, according to the length of the vine—never less than two—about three feet square. My reason for doing so is, to get the roots beyond the influences of the sun, as they are naturally inclined to approach the surface, causing the vine to throw out an unusual quantity of foliage and fruit; and when the dry season commences, they feel the drought immediately. After the vine has been established for three years, I dig down and cut off every root from the main body. In doing so, I dig a trench each side of the vine a foot deep, from two to three feet wide, and fill it up with all sorts of rubbish, such as pea-brush, bones, shoes, &c. I chop up all my vine trimming in pieces of about eight inches in length, and throw them in the trench. I then throw the ground taken from the ditch over the whole, then cover the surface, as far as circumstances will permit, with long litter, pea-brush, &c., in order to exclude the sun as much as possible. By excluding the sun the ground becomes moist, and is pierced with thousands of angle worm holes. Whenever we have a shower, the rain filters through, and is carried down those holes to the roots. I do not think it necessary for the sun to touch the earth at all; and this I think I have fully proved. I have one grape vine that I planted in the rear of my kitchen, which it afterwards became necessary to occupy for a wood-house. Not liking to cut it away, I bent it down and laid the floor over it, so that it has been with the roots entirely under the building. Every year this vine produced as much fruit as it is capable of sustaining. It has a northerly exposure, and the grapes are usually the first ripe on the place. I do not think the berry quite as large as those that stand in a more open exposure; but the flavor is equally fine. I have one vine that has a westerly exposure, planted shallow, and the surface not covered: this dry weather, the fruit has entirely perished. The next vine to it was planted in the same exposure and same depth, but was afterwards filled in so as to bring the root about three feet under the surface, which was not covered with rubbish; the fruit has not wilted, but is not near the size of those vines which had a covered surface. I have one perpendicular arbor running due north and south, and from the top of the arbor I have conducted several vines east and west. The fruit on the vines running west ripens ten days sooner than on those running east. I have changed the vines, and the result was the same. I occupy no more ground with that arbor than the mere width of the post, which is about seven inches; and I cultivate on each side of it, close up to the post. I do not think it necessary, in order to cultivate grapes to any extent, to occupy any more space than the width of the post. I think the vine is all the better for having any sort of a green crop on the surface near it, so as to exclude the sun.

If I were going to set out a vineyard, I should set a row of posts six feet apart, then another row of posts parallel to them, thirty feet distant from the first row. I would then plant a vine at each post, and conduct a No. 12 wire from the top of one post to the other. I then could use the intermediate ground for any short crop of garden vegetables I wished. They would all do well; and, by training a single vine up the post, across the wire, I would get full as many grapes, if not more than when the whole arbor was occupied; and the wind has no effect upon it, the wire being so flexible that they do not suffer as much as those that are trained on an arbor. The posts ought to be high enough to drive under with a horse.

My time of trimming is late in the spring; at least I never commence trimming until the vines will bleed freely, which a great many people con-

sider a great detriment; but when I cut out old wood, I always cut it three or four feet longer than I intend it shall be, so that when the first cut becomes gummed over, I cut away some more, to give the sap a free passage. I will venture to say my vines are the largest in the State of New York, for their age. The great difficulty with me is, that they are so loaded with fruit that I am obliged to pick off large quantities when green. In consequence of the superior flavor of my grapes, owing, I think, to the surface of the ground being covered and tilled, I have no trouble in selling them in advance, as I have now done for the last two years. Messrs. Hope, corner of Chamber street and West Broadway, have engaged them.

In trimming, I suffer no old weed to remain that I can possibly remove, and trim the ones I wish for bearers entirely smooth. I also make a second trimming in the course of the season, by removing the middle growth.

For the Farmer and Mechanic.

GRAPES.

Mr. Editor: I have just read in your valuable paper an article on the culture of the grape, by James Locke, of Sing Sing. Mr. Locke appears to attach much importance to deep planting, or compelling the roots of the vine two feet below the surface. Dr. Underhill, too, favors the same opinion. Is not this altogether at variance with agricultural chemistry? Such is my impression from reading Liebig, Johnston, Dana, and others; but, independent of these, I know from experience that it is altogether wrong. It is an old-fashioned practice in England to make vine borders of prepared compost to the depth of six feet. I have had occasion to overhaul these several times, and invariably found the bottom of the border totally unfit for any plant to live in. Ten years past I had the first opportunity of seeing the grape vine in its natural state; and, being passionately fond of growing the grape vine, I examined them closely, in the woods, on the banks of the Hudson. I have dug up dozens of them, and invariably found their roots within six inches of the surface. From the past season's experience, I am more than ever convinced that to plant the grape vine deep, or, which is the same thing, to fill up so as to bury the roots two feet below the surface, is detrimental. In the situation I now am, I have the charge of three vineyards; in the first of which the vines (six years ago) were planted too deep—consequently did not thrive well; to remedy this, fresh compost was added the next season, but without benefit; another gardener came—two or three in fact—and ("a curse, by the way, to most vineyards, this repeated changing") each of them took the same course; so that the roots (that is, the original roots) were buried all of three feet below the surface. When I came this past spring, I forked up part of the border very carefully for fear of injuring the roots, but was surprised not to find any within reach. I then took a spade and dug down two feet, six feet from where the vines were planted, and there found some brown looking roots, which I traced to their extremities, and found that the whole of last season's formation had decayed. I then gave up all hopes of perfecting a crop of grapes; but, luckily, there was a small space of about four feet in width from where the vines entered the house to the flue that had been filled up for salad, &c, and into this border the vines had rooted from the stem.

With these roots, well fed with guano, liquid manure, &c., and with the few roots made from the stems on the outside of the house, "near the surface," I have ripened a crop of grapes averaging twenty pounds to the rafter—being the first *crop* of grapes ever brought to maturity in this house since the vines were planted—and some of the fruit judged of sufficient merit to take the second premium of the State society.

I visited the vineyard of Dr. Underhill about four years since, in company with another gardener, and thorough grape-grower, too, and it was the impression of both that the grand secret of the doctor ripening his grapes so uniformly was a remarkably light sandy soil; the roots near the surface, and yet prevented from being scorched with the sun by a liberal application of swamp muck as a top dressing—apparently not intended as a manure, but to preserve a uniform temperature in the soil.

Cutting off the roots of the vine does not prevent their finding their way to the surface; it may do so for a short distance, but it should be borne in mind that the vine is a great rambler, both top and bottom; and, after cutting off all the roots two feet below the surface, it may still be a fact that the spongioles, on which the vine depends for nourishment, are found close to the surface, though it may be at a distance of fifty feet from the vine.

Mr. L.'s plan of training and pruning the vine I like very much; I believe it to be the only plan of growing the native grape so as to obtain fair bunches of well flavored fruit, but think the less he crops the intermediate space the better. For the first three years after planting, two or three rows of potatoes might be taken off; but after that, keep the surface covered with muck, and the cultivator freely at work.

Very respectfully yours,

G. K.

Newark, *September* 20, 1845.

From the Visitor.

* * * * * * * * *

But I sat down to tell you something about my grape vines, and now I will stop rambling and do so. Having a spot on the south side of my house which I thought would be favorable to the growth of grapes, in the fall of 1842 I erected an arbor by setting posts, leaving them eight feet out of the ground and fifteen feet from the house. On the tops of the posts one end of a sixteen-foot scantling was rested, the other end resting against the house, sixteen feet from the ground. These scantlings were crossed with two-inch strips, about two feet apart. The upright posts were also crossed in the same manner as the top of the arbor. Early in the following March I dug a trench at the foot of the posts, two feet wide and three feet deep. I then filled it half way up (eighteen inches) with oyster shells, and the remaining eighteen inches with loam taken from the commons near the city. In this loam I immediately set my roots, having vines attached to them of about two feet in length. Directions were then given that all the waste water from the kitchen—dish-water, soap-suds, &c.—should be daily thrown around them, which was done. One of the vines blossomed and bore the first summer; but an unlucky boy, strolling into the garden, broke off all but a few grapes, which ripened, and were found to be delicious. Their growth this first summer varied from five to ten feet in length, besides throwing out great numbers of lateral branches. I did not trim them

at all the succeeding winter. Early in March last, it being the second spring only that they had been in the ground, they began to put forth. I do not remember the time of their blossoming, but in July the neighbors began to pick, and pronounced them ripe. This, however, was not the case. The vines then, notwithstanding the severe drought which had prostrated almost every thing around us, presented as beautiful an appearance as I ever beheld. Thousands of branches and tendrils had put forth, the leaves were large and fresh, and the fruit hung under the trellis-work in delicious and tempting profusion. The branches were not so numerous as I have oftentimes seen them, but they were twice as large as any other that I saw during the summer. One vine, however, of the bigness of a man's finger, contained *one hundred and twenty bunches*, all perfect, and of extraordinary size and flavor. These were the Isabella; the Catawbas did not yield so abundantly, and the Sweet-water not at all, as yet. The latter had not the advantage of the trench and the oyster shells, but in other respects were treated the same. During the extreme dry weather I occasionally threw fresh water upon the vines from a watering pot, and from a large syringe where they were high.

In this my first attempt at raising grapes, I have been highly gratified; and, from the experiment, I am satisfied that the vines require a great deal of water, but in small quantities at a time, and that it should never stand long about the roots. The oyster shells serve as a drain to carry off water which might otherwise remain too long; and as it percolates among them, it carries down the fine mould, which the small, delicate roots soon find, and thus, below the effect of drought, find a never failing source of nourishment and support. In the autumn I throw around the roots a thin coat of coarse manure, old bones, and chips.

A gentleman in Rochester, New York, who has a fine grapery, informed me last summer that he put up grapes for use in the following manner: Place a layer of cotton in a barrel, and then select such grapes as are perfectly ripe and lay them upon it; cover them with another layer of cotton, and so continue till the barrel is full; then place the barrel in a dry place, out of the way of frost, and they come out through the winter in all the pulpy lusciousness of a bunch freshly plucked. * * * * * A portion of these grapes, thus preserved, remained upon the vines till into October, when they were as rich as any foreign grape that I ever tasted. I am confident that most of our grapes are eaten before they are ripe. I intended to have made the experiment of putting them down in cotton, but they proved too tempting to remain on the vines in sufficient quantities. A neighbor has made it, however, and I expect soon to learn with what success. I think the vines should be trimmed early in January. This climate is highly favorable to the culture of the grape, and nothing is wanting but a little pains to produce them in any quantity. I should be glad to know how attempts to cultivate them succeed in New England.

Truly yours,

SIMON BROWN.

As yet, little has been done in New Hampshire to advance horticulture. Even the profits and the gratification from the production of that excellent fruit, the apple, are as yet but beginning to be realized. The best methods of cultivation are yet little understood. Our soil and situation are most favorable for the apple. We believe the time is coming when the peach

may be common. Pears and plums will also adapt themselves to our climate. There are kinds of our own native grape which, by cultivation, may here be made equal to the Isabella, the Catawba, or the Sweet-water. Let Mr. Brown's mode of thorough cultivation be marked, "set in a note book, learned, and conned by rote," by men of curiosity and leisure, and we dare say these northern latitudes will secure to us abundance of grapes as good for use at least as the Smyrna grapes, for which those who get up genteel entertainments pay an expense of thirty seven and a half cents per pound—a price at least four times as great as any food to pamper the fastidious palate should cost.—*Editor of the Visitor.*

NATIVE GRAPES FOR WINE.

The following is extracted from a letter of a gentleman in Alabama, whose name and residence are not given. It is possible that some of the native grapes, much inferior to the Catawba in flavor, may prove to be the best for wine. The wine grapes of Europe are generally very inferior as table grapes. A gentleman in Mississippi City cultivates a small native grape which is said to make an admirable wine:

"I make, annually, for my own use and to scatter among friends, from seventy-five to one hundred gallons of wine. I prefer it for a summer drink, using no spirits. The red wine was made from our native, uncultivated grape, which abounds through this section of the country; some of the finest varieties of which I am cultivating, previously having determined their qualities as regards producing a good wine.

"There is an astonishing variety in the product of our native grape, all of which are cultivated with great ease, and exhibit, on cultivating, an improvement hardly credible.

"Among other properties possessed by our native grape, the quantity of vinous matter they possess is most remarkable. A bushel of bunches, as pulled from the vine, will give three gallons of the wine I sent you; and, after undergoing a second operation, about one gallon more, of a lighter but most agreeable wine. It would take a third pressure to produce the meagre drink with which they in part feed the peasantry in France, &c., who tend the vintage. I anticipate most agreeable results from the cultivation of our native fruits, based on the trials I have already made.

"The white wine I sent you is from an American grape, acclimated to this section of the country many years ago. It is a reddish-colored grape, resembling the Catawba, exquisite for the table, a great bearer, and hardy.

"As regards the cultivation of the grape, and wine making, I have effected one most desirable object, viz: doing away altogether with that great expense, of which so much has been written and said. The ground in which my vines stand and bear produces me annually two other crops—say a crop of Irish potatoes, and, after they are matured and taken from the ground, another crop the same year of a variety of the red sweet potato, a most valuable variety for stock, and most productive. My mode of supporting the vine is simple, efficient, and economical. The manure given to the Irish potato crop is ample for the vines, and applied in the best possible way. The superiority of the grapes I produce, as regards quantity and quality, has been often loudly remarked by our own citizens and foreigners.

"I have a splendid collection of the apple, all acclimated. The cider apple is, perhaps, the most beautiful tree of the kind you have seen; a most free grower, and prolific, bearing annually full crops. It is the best apple to hang on the tree, and the freest from rot, I have ever seen. It cannot be surpassed in the Union. It is a native of Alabama, produced from repeated planting of seed, and grafting and regrafting, for the last twenty-five years.

"A vineyard at maturity—say the fourth year—would be good for from five hundred to seven hundred and fifty gallons; the seventh, for one thousand gallons; the Scuppernong much more to the acre.

"My mode of planting and cultivating the grape—half the quantity per acre—and the annual crop mentioned, please me better. Ground with us is plenty, and potatoes are as essential to our comfort as wine. In fact, in every species of cultivation I am every day more convinced that mixed cropping is the true mode of employing soil and labor. In this way the expense and labor are singularly decreased in proportion to the product.

"By giving the vines room, I insure heavy crops of grapes and rich fruit. I tend, prune, &c., with satisfaction; the first with the plough, and a little with the hoe while making the potato crops. The room enables me to gather the fruit with ease, and readily.

"I employ the trellis in cultivating the grape. In all respects it is the best. Our native and such other grapes as I cultivate prefer it. This appendage to the vineyard costs me about five dollars annually per acre, including pruning. I cut down sassafras or cedar trees—say nine and ten inches in diameter—into posts eight feet; point the butt end; put the small end in the ground, ten feet distant; nail on the sides laths about two inches square, just as split from the cypress log, and my trellis is done. My tying (the best I have ever found) is the bear grass, found readily in the woods profusely scattered in spots: shrunk over the fire when green, it becomes a soft, pliable tying. Thus you see I am all economy, and no part of the 'Indian's gun' cost more than it came to."

SUCCESS OF AMERICAN VINEYARDS.

Messrs. Fleet & Starr: Seeing some disquisitions lately in your valuable periodical on the manner of planting the grape vine, I concluded to forward you a few thoughts on that and like matters. Notwithstanding exceptions, (and they made evident in the given cases,) it may be laid down as a rule, that success in any branch of agriculture, as well as in most other pursuits, is the best *prima facie* evidence of right procedure therein; or, that there is an intimate connexion established by Providence between the attainment of any object of enterprise and all the steps that lead thereto. To apply this rule to my vineyards: After some dozen years of culture, I have, most flourishing and prolific, six acres of vines, old and young, part of which (the older) form a continuous canopy, say eight or ten feet high over head, and underneath nothing to intercept the passage of wind, teams, or people; or nothing to be seen underneath but the main stems of the vines, from ten to twenty feet each way, and posts ten feet apart. The planting of all my

vines was on the principle common with my other procedure on the farm in that respect, viz: in reference to the fact of all the vegetable creation having tap and lateral roots, and that both must be sustained in some appropriate way, that the desired end of prolific issue may be attained. Some plants may be called tap-rooted because mainly depending on tap-roots, as cotton, turnips, &c.; others lateral-rooted, because mostly sustained by their lateral roots, as corn, &c. But both kinds of roots must, as a general rule, have their office sustained, or no adequate success will be had in their culture; but, so far from a culture exactly adapted to either, in my experience, I have had desired success in a method common to both: for instance, while I raise turnips by putting manure in drills and bedding thereon, and then planting. I have done the same with corn, and had like success, with this difference only—with turnips, to have the bed raised with an eye to drawing dirt from them in cultivating; and corn, with a hollow rather when planted, except it be in a low or damp location. But it may be laid down as a rule, that no planting or culture should be so deep as to neglect the existence and sustaining of lateral roots near the surface, or near enough thereto for the sun's heat to have its genial influence. So with vines and trees. You even do a violence to their nature to plant or cultivate them too deep, which violence will be revenged, generally, by a small or no yield at all. The general rule for planting fruit trees will aptly apply to that for vines, viz: to plant an inch or so deeper than they stood when growing in the nursery. I say in the nursery, as to vines as well as trees, for I consider (and practise) that grape vines should first be cultivated in the nursery a year or so before eligible for setting out in the vineyard. The Scuppernong, not growing from cuttings, I first root by layers, and then make them well-rooted vines in the nursery ere planting in vineyard, or selling. But other kinds of vines I cultivated first in the nursery by cuttings, often being thickly set in drills three feet apart. By-the-by, fall planting is decidedly most successful for cuttings. Frequent discouragements in vineyard culture arise from attempts to start vineyards with cuttings, and not well *rooted* plants.

And whatever is said of European culture—of short distance apart and humble height, and of servile imitation of foreign modes in our country—certainly the American mode of 10 or 20 feet apart, and say 30, 40, 60, or more, length of branches on scaffolding, would seem to make *an up-hill business* of beginning a vineyard with cuttings. Plants as well as animals are of gigantic growth in America, compared with *eastern size.* And no success has yet been attained, and I predict never will be, by *thwarting* instead of *aiding* nature in vine culture. Hence the reiterated abortive attempts of foreigners to succeed with the vineyard business in our country. All attempts at planting vines very deep, or cutting off upper roots and the like, will generally prove worse than useless trouble in America. All the disturbing of lateral roots of my vines is that of the mere surface ones, by shallow working with cultivators, harrows, and the like, to prevent the undergrowth of anything, and to incorporate all fallen leaves with the soil beneath the canopies, as equivalent to nature's plan of keeping up the fertility of the woods. But, to conclude these hastily written and desultory remarks, I will state briefly the yield of a quarter of an acre of vineyard nearest my house, and managed, *from the start*, according to the above hinted American plan. The kinds of vine are mostly Scuppernong, with some of my Halifax, Norton's V. seedling, and Cunningham, besides; grapes gathered and shaken, (the Scuppernong grapes by holding a large sheet

underneath the canopies, and shaking the branches above with a forked stick, when all ripe ones fall,) to make wines—quantity not calculated precisely, but say several barrels. The following drains upon said quarter were had for more than a month, viz: Visitors daily therein, to pluck the fruit on the advertising terms of 20 cents each entrance, and commutation for companies, (partaking standing on fixtures, to reach the grapes above,) and grapes gathered to carry away at prices of 40 cents per gallon. Frequently 20 or 30 visitors a day; and at one time 60, and at another 95 white persons, besides colored servants, mostly partaking of the fruit of said quarter of an acre. When the 95 had eaten abundantly and retired, some of the company went back to see the change of appearance as to fruit on the canopies, and reported they could not miss the grapes, or was no perceptible alteration as to appearances of branches well loaded everywhere. In short, the calculation is, that from visitations and sales of grapes, and product of wine, this quarter acre yielded at least 50 dollars profit the season, or at rates of the interest on 800 dollars, or more than 3,000 dollars the acre. This statement, to those not conversant with the prodigious bearing qualities of a well managed American vineyard, may appear incredible. But the same statements in other periodicals, as the Cultivator, read in my region, would jeopard my veracity if not true. My list of vines you may see in the November number of the "Albany Cultivator;" which list have the goodness to transfer into your columns, as if for you written. Strain the grape juice through several folds of a woolen blanket, and then add at least two pounds of sugar per gallon, and my word for it, a good wine will be the result; and better for some tastes, at least, than if a fourth of spirits be added, and one pound of sugar per gallon.

In haste, yours, &c.,

SIDNEY WELLER.

BERKLEYVILLE, HALIFAX CO., N. C., *October* 22.

LETTER TO THE HORTICULTURAL SOCIETY.

CINCINNATI, *September* 26, 1845.

MR. PRESIDENT: Upon referring to some memorandums of my father, I find amongst others the following account kept of the produce of his vineyard since 1837. As a number of our members are cultivating the vine, I thought it would be interesting, as it is difficult to obtain a statement of the kind kept minutely for a series of years.

It shows the actual produce, and the certainty of the crop before any other fruit in this latitude, and the difference between the Catawba and Isabella as to the yield and certainty; the Isabella having borne a first rate crop for nine successive years—the Catawba failing occasionally, from rot and the effects of insects.

The vineyard has a southern exposure, fronting on the Ohio river—was planted with rooted plants in 1834, and contained at that time 1775 vines, placed in rows four feet apart, and three feet distant in the row; the ground being previously trenched, and the stones taken out to the depth of two feet.

In the fall of 1837, the first crop was picked, as follows: 164 bushels grapes, from which was made 667 gallons of wine. At this time there were

1,125 Isabella and Cape vines, yielding 113 bushels, making 469 gallons, and 650 Catawba, yielding 51 bushels, making 198 gallons.

1838, vintage,	September 10,	produce	327	gallons.
1839, do	September 5,	produce	440	do
1840, do	September 20,	Isabella	240	do
1840, do	September 20,	Catawba	45	do

This year (1840) most of the Catawba rotted on the vines. From this time there were 2,300 vines—about one-half of each kind.

1841, vintage, September 15, produce	237	gallons Catawba.
1841, vintage, September 15, produce	275	gallons Isabella.
	512	gallons.
1842, vintage, September 12, produce	166	gallons Catawba.
1842, vintage, September 12, produce	319	gallons Isabella.
	485	gallons.
1843, vintage, September 15, produce	250	gallons Catawba.
1843, vintage, September 15, produce	288	gallons Isabella.
	538	gallons.
1844, vintage, September 12, produce	108	gallons Catawba.
1844, vintage, September 12, produce	306	gallons Isabella.
	414	gallons.
1845, vintage, September 9, produce	283	gallons Isabella.
1845, vintage, September 9, produce	349	gallons Catawba.
	632	gallons.

About one eighth of the Catawba grapes were destroyed by bees and other insects, after ripening.

The quantity eaten by three families is not taken into this account.

The ground has always been thoroughly hoed in the spring, and kept free from weeds; never manured until last winter, when the ground was covered, and dug in in the spring; and from the result this season, it would pay well, as the vines are in better condition than they ever were after yielding a heavy crop.

The vines have been trained to stakes, and the bearing wood cut out, after having borne one season, leaving two shoots, trained the same season—one to form the bearing hoop or bow, and the other cut to two eyes, to propagate wood for the next year; the vine never having but the hoop and the two eyes left for fruit each year growing at the same time.

This year the ends of the vines have been nipped and the suckers taken out four different times.

The following estimate I have made from what it has cost this year, and is not far from the actual expense, although the labor has been done by the

hands doing the other work on the farm; and in making wine, extra hands were always employed. By planting cuttings, and preparing the ground by sub-soil ploughing, when it can be done, would lessen the expense. The price is what the wine was sold at from the press the season, and is a low estimate.

Estimate.

2,300 vines, at 6 cents - - - - - -	$138 00
2,300 poles, at 2 cents - - - - - -	46 00
1,000 poles replaced - - - - - -	20 00
Trenching ground and planting - - - -	80 00
Manuring last fall - - - - - -	30 00
Two months' work each year, 9 years - - - -	225 C0
Extra work in making wine - - - - -	150 00
Interest on investment before crop - - - -	15 00
	704 00
Credit by 4,306 gallons wine, at 75 cents - - -	3,229 50
	2,525 50

The expense of cultivation previous to the first crop is not accounted for, nor are the press, casks, &c.; but the actual expense of cultivating an acre of grapes, where persons are hired to attend to other work, would amount to but very little, as but a short time is required to attend to cleaning the vines during the season.

Yours, respectfully,

WM. RESOR.

REPORT ON WINES.

[Report of committee appointed by the Cincinnati Horticultural Society, 1844.]

The Committee on Wines beg leave respectfully to report:

That, in order to fulfil the duty assigned them, of examining the specimens of the wines produced in our neighborhood, they assembled at the house of the president, where all those specimens which had been sent to the society were collected and arranged, and your committee then and there submitted them to the proper investigations, *secundem artem.*

Your committee, although by no means diffident in respect to their own skill and talents in estimating the true character of the articles whose qualities they were called upon to determine, judged it expedient to ask the aid of several German gentlemen, who have been accustomed to judge of the qualities of the European wines to which those of this region bear the strongest resemblance; and, in compliance with this request, Messrs. Brachman, Werk, and Rehfuss attended their session, and politely afforded them the aid of their judgment and experience.

The wines were designated by labels, which referred to sealed descriptions of their ages, owners, &c., and which were not opened until the

judgments respecting them had been pronounced and duly recorded. The subjoined table gives the result of their trial.

Marks and Nos.	Verdict of the judges.	Name.	By whom sent.
C. A. 1837 -	Good - - - -	Catawba - -	J. E. Mottier.
" 1844 -	New, not matured - - -	Do - -	Do
" 1835 -	Very good, resembling old Madeira	Do - -	Do
" 1834 -	Fine, resembling Muscat or Malmsey - - . -	Do - -	Do
" 1843 -	Good for new wine—with age, will be of the best quality - -	Do - -	Do
" 1837 -	Good, high flavored - -	Do - -	Do
" 1838, F.	Superior to any of the previous specimens - - -	Do - -	Dr. Flagg.
" 1831, F.	Good, resembling Hock - -	Do - -	Do
R. H. 1837 -	Good dry wine - - -	Do. R. B. -	J. Resor.
R. 7 -	Good - - - -	Do do -	Do
M. C. 1843 -	Best new wine—will be superior with age - - -	Do do -	J. E. Mottier.
S. E. -	Not good - - - -	French wine -	A. Owen.
B. H. -	Good dry wine, but supposed to be foreign - - - -	German wine -	Mr. Brachman.
C. A. No. 8 -	Medium quality, resembling Hock	Hockheimer - -	N. Longworth.
No. 3 -	Good strong wine - - -	1830, Catawba -	Do
No. 7 -	Not American wine - -	Spanish Manzinello -	Do
German label	A good wine, but not the best -	1830, Catawba -	Do
R. F. No. 1 -	Inferior, a foreign wine - -	Old Hock - -	Dr. Rehfuss.
" No. 2 -	Good, about equal to No. 4 -	1839, Catawba -	N. Longworth.
C. A. No. 4 -	Good, about equal to or better than No. 8 - - - -	1837, do -	Do
" No. 6 -	Good—considered by some better than No. 8; by others not so good	1837 do -	Do
" No. 1 -	Inferior to No. 8 - - -	Catawba - -	Do
S. F. 1 -	Very good, resembles Manzinello	Spanish [on skins	S. E. Foote.
N. 60 -	Good Cape wine, very ripe -	Cape, not fermented	N. Longworth.
" 70 -	Very good, resembling Madeira -	Cape, ten years old -	Do
" 50 -	Old wine, but indifferent - -	Lenoir on the skins -	Do
No. 40, N. -	Poor, fermented on the skins -	Ohio grape - -	Do
No. 10 -	Not liked, supposed to have been injured in the bottle - -	Mo., 1841 - -	Do
No. 3, M. -	New and good Catawba - -	–	Do
No. 34, M. C.	Very good Cape - - -	–	Do
No. 37, M. C.	Good, but not equal to the preceding	–	J. E. Mottier.
No. 35, M. -	Good, better than No. 34 - -	–	Do
No. 44. M. C.	New Cape - - - -	–	Do
No. 2, 2d -	Good old wine - - -	–	Do
No. 41, C.	Very good Catawba, resembling Rhenish more than any other -	–	N. Longworth.
No. 1, 2d -	Tolerably good - - -	–	Do
No. 34 -	Very good, old - - -	–	Do
	Do. do. - - -	–	Dr. Smith.
	Good new, not in a suitable state for judgment - -	–	Do

The judgments pronounced and recorded in the foregoing table were as nearly unanimous as can ever be expected among so many judges. It will be seen that several of the specimens were foreign wines, included probably to test the connoisseurship of the committee; it will also be seen that the committee stood the test reputably. The result of the examination is a conviction on the part of the committee that our soil and climate are well adapted to the production of a very fine, delicious wine, and that the

Catawba grape is the species which yields the finest qualities. It will be seen that the greatest number and variety of the specimens examined were from the several vineyards of N. Longworth, esq., who has been longest engaged in the cultivation of the vine, and in perfecting the manufacture of wine. Mr. Mottier and Jacob Resor, esq., who have lately acquired a good reputation in this department of horticulture, were next to Mr. Longworth in the number and variety of specimens furnished. These, with the single specimens of Dr. Flagg, and the two specimens of Dr. Smith, confirm the opinions of the committee, that the pure juice of the grape, when judiciously managed, will furnish the finest kind of wine, without any addition or mixture whatever; that no saccharine addition is necessary to give it sufficient body to keep for any length of time in this climate. In confirmation of this opinion, we would state that two of our German friends who were present informed us that they had taken, on different occasions, specimens of the wine of this county to Germany, and submitted them to the judgment of various connoisseurs in that country, by whom they were highly approved; the principal or only objection being that they were too strong to compare with the fine kinds of the lightest German wines. A taste for the wines of this region appears to be well established, since all that can be produced finds a ready market at good prices; and the committee are of opinion that the period is not distant when the wines of the Ohio will enjoy a celebrity equal to those of the Rhine.

D. B. LAWLER,
S. F. FOOTE,
M. FLAGG,
JACOB RESOR,
ELISHA BRIGHAM.

From the Cincinnati Farmer and Gardener.

CULTURE OF THE GRAPE.

As public attention, at the present time, seems to be somewhat enlisted in the culture of the grape, and as its success is pretty well established in the vicinity of Cincinnati, where it is rapidly extending, a brief sketch of the most approved mode of establishing a vineyard may be acceptable to some of your readers.

The first step, then, is the preparation of the ground. The sides or tops of limestone hills are generally chosen for the location, where the water runs off readily. South and southeastern exposures are the best in this climate. Three modes of preparing the ground are usually adopted here. The first consists merely in deep ploughing, with a common plough, as for potatoes, and making the surface fine and mellow with the harrow. The second method goes one step farther, and a second furrow is cut in the bottom of the first; in the bottom of the second furrow a sub soil plough is run, which breaks the ground, altogether, to the depth of sixteen or eighteen inches; it is then harrowed and prepared as in the first. The third method is by thoroughly trenching with the spade, to the depth of not less than two feet. If the hill-side is steep, (say at an elevation of twenty or thirty degrees with the horizon,) terraces are also raised from two to four feet in height, and extending up the hill from twenty to sixty feet each, according

to the acclivity of the surface. By this last mode, the top soil is all thrown into the bottom of the trenches, and the sub soil, which is generally clayey, thrown upon the top, and left sufficiently smooth for planting. Where stones are found in the soil, they are thrown out on the surface, as the trenching progresses up the hill, and if in sufficient quantity, are laid up in walls to support the terraces. The terraces are made to run horizontally along the hill side, or nearly so, with an open ditch, for a drain, at the upper edge of each terrace, and a similar horizontal ditch as often as once in eighty or a hundred feet, where the ground is not terraced. These drains should lead to the lowest point in the vineyard, where a suitable drain should be constructed down the hill to carry off the surplus water in heavy showers, and may be covered like a culvert, or left open. In each case the vines are planted in rows, four feet apart if to be worked with the hoe and spade, and from five to six feet if to be worked with the plough or cultivator, and should always run horizontally with the terraces and drains. The distance between the vines in the row varies from two and a half to four feet, according to the mode of training which is to be adopted.

Cuttings of the vine, with three or four eyes, are sometimes planted, at proper distances, in the vineyard; but the usual practice is, to plant them first in a nursery, in rows, about eighteen inches apart, and from four to six in a row, to strike root; here they are to be well cultivated, and allowed to grow one or two years, when they are taken up in the spring and planted out in the vineyard. The fourth year from the cuttings, (that is, after they have had three summers' growth—two in the nursery and one in the vineyard,) they may be allowed to bear a full crop, or nearly as much as they ever should be allowed to bear thereafter; which is about one-fourth of a peck of grapes to each vine. One acre of ground, planted six feet by three apart, will contain about twenty-four hundred vines; consequently, will yield about one hundred and fifty bushels of well-assorted grapes, which will make three hundred gallons of wine—sometimes a little more. An acre of good ground, well trenched, and planted with Catawba vines, after it has acquired six or seven years' growth, may be made to yield a much greater quantity; and some small vineyards below Cincinnati, on the hills of the Ohio river, have produced at the rate of eight hundred gallons per acre; but the vines were planted four feet each way, making twenty-six hundred and forty vines to the acre; but the proprietor admitted that his vines were injured by over-bearing, and that his wine was inferior in quality when allowed to produce that quantity.

I give three hundred gallons as the full average quantity of wine made to the acre in the neighborhood of Cincinnati. Of course, much variation will depend upon the manner of establishing a vineyard, and its subsequent treatment.

The comparative merits of the different modes of preparing the ground for a vineyard cannot, as yet, be settled by experience in this part of the country, as the oldest vineyard, I believe, has not been established more than twelve or thirteen years. Vineyards planted at Vevay, in Indiana, by the Swiss, merely on deeply ploughed ground, failed in fifteen years. When the ground is ploughed eighteen inches deep, it may bear tolerably well for twenty years; but a vineyard planted on ground well trenched two feet deep, and properly drained and cultivated, may be expected to last fifty or one hundred years—perhaps more. The crop, also, is much more cer-

tain when the ground is well trenched, not being so liable to suffer from droughts or rainy seasons.

The advantages of deep trenching have become so apparent to those who have had the most experience, that nearly all who can afford it are now preparing their ground in this manner, although done at an expense varying from eighty to one hundred and twenty-five dollars per acre, according to the character of the ground. This, with the addition of twenty-four hundred vines, at sixty dollars per thousand for one year old vines, (the customary price in this market,) with the cost of planting, will make the expense of one acre, exclusive of land, stakes, &c., at least three hundred dollars, or, without trenching, about two hundred.

S. MOSHER.

From the Boston Cultivator.

A DAY AT THE REYBOLDS' IN PEACH HARVEST.

Desirous of affording our readers the means of forming some idea of the magnitude and importance of the peach business of Delaware, we lay before them the details of "A day spent at the Reybolds' in peach harvest."

We took passage from Philadelphia by the steamer Pioneer, at Arch street wharf, at 7 o'clock on the morning of the 29th August, (Reybold's wharf adjoining being full to overflowing with his empty baskets in transitu,) passing the steamer Napoleon, which had arrived at the railroad wharf on the Camden shore, and was discharging her lading of 3,000 baskets of Reybold peaches for the New York market. During the passage to Delaware City we were continually passing boats of different descriptions loaded with peaches for the Philadelphia market; reaching the wharf at 11 o'clock, 40 miles below Philadelphia, where it was with difficulty that we could pass along it, for the rows of baskets of Reybolds' peaches, three tiers in height, and extending about one hundred yards in length, flanked with carriages, from the six-ox and six-mule wagons, counting their 125 baskets each, to the single-horse cart or dearborn, with its score or two, awaiting their turn for unloading; reloading with empty baskets and driving furiously back for more—a scene which bade defiance to imagination.

Here we found the Reybolds loading a sloop, which departed for Philadelphia with 1,230 baskets, only to make room for the Cohansey steamer, on board which were placed 1,000 baskets more; and then they began to prepare the evening's loading for the Napoleon, that had returned from Philadelphia during the day, on which were put 1,700 baskets from the orchards of Messrs. John, Philip, jr., William, and Barney Reybold, when she proceeded to the wharf of Major Reybold, which is situated in the midst of his orchards, to complete her loading—another 1,490 baskets—starting for Philadelphia so as to be again in the market before daylight next morning, with a total of 3,190 baskets.

The details of this day's shipment, therefore, are as follows:

On board the sloop - - - - -	1,230 baskets.
On the steamer Cohansey - - - -	1,000
On the steamer Napoleon - - - -	3,190
Total baskets - - - - -	5,420

from the Reybold peach orchards only. These all reached their destination before daylight next morning, consigned to Mr. Anthony Reybold, by whom they were disposed of before 11 o'clock, at from 16 to 31 cents per basket, containing about 3½ pecks each.

From the books of Major Reybold and his sons was ascertained the quantity of peaches sent to market to the 29th August, inclusive, viz:

Major Reybold, from his Maryland and Delaware orchards	31,145 baskets.
John Reybold	13,300
Philip Reybold, jr.	6,000
William Reybold	5,699
Barney Reybold	7,200
Total number of baskets	63,334

Number of baskets employed for transit	40 to 50,000
Number of acres of orcharding	1,090
Number of trees planted in orchards	117,720

Business detaining us in that part of the country, we returned to Delaware City on the 31st, and found the Reybolds loading two large steamboats at the wharf—the "Napoleon" for Philadelphia, and the "Mutual Safety" for New York direct by sea; the latter of 700 tons burden, leaving with 3,581 baskets on board; the former completing the shipment for that day, a total of 4,075 baskets, having taken, the day before, her usual loading of near 3,000. Here we saw three steamers loading with peaches at the same time, while the empty return baskets had numbered 16,000 within the last 24 hours. Major Reybold has it in contemplation to start a large steamer with peaches direct to Boston! Success attend him!

In conclusion, we would add, Mr. Philip Reybold, jr. is extensively engaged in the nursery business, more particularly in the raising of peach trees, of which he has from 60,000 to 80,000, 5 feet high and 2½ inches in circumference, from the seed the present season; and, from the facilities which he enjoys, as well as the peculiar care and attention employed, those requiring the very finest varieties, so as to form successional orchards, may depend upon a supply of trees true to character and of "most magnificent proportions." It is worthy of remark that the largest peach ever raised in England, by the most careful culture, measured 12 inches in circumference, while in the orchards of the Reybolds, the present year, one has been found to measure 11½ inches in circumference, and hundreds from 10 to 11, in the open ground, and the largest crop, perhaps, on record—the third in succession.

At the conclusion of the harvest, we will endeavor to present our readers with the sum total of peaches sent to market from Newcastle the present season.

JAMES PEDDER.

PHILADELPHIA, *September* 1, 1845.

From the New York Farmer and Mechanic.

NEW YORK FARMERS' CLUB—TUESDAY, *May* 20, 1845.

Cheever Newhall, esquire, vice president of the Massachusetts Horticultural Society, in the chair.

PEACH TREES.

Mr. Wakeman.—I present a paper on the peach tree, from my worthy friend George F. Hopkins. The well known havoc made by its enemies upon that delicious fruit tree renders every suggestion for its defence and conservation most acceptable. The letter recommends tobacco tied around the bodies, and the application of alkalies, of whale oil, and of blacksmiths' cinders, to the roots. I noticed a case in Philadelphia of a tree on the roots of which hot water had been poured, and soot and lime applied, and the tree bore good fruit every year for twenty years. I refer to Mr. DePeyster's statement, at a former meeting, of his success in consequence of placing anthracite coal ashes around the roots of peach trees.

Col. E. Clark.—Lime recently burnt, placed at the root of a tree, has the effect of killing worms; many of them are dissolved, when in contact with the lime; being moist, they afford the means of their dissolution. Common tansey planted next to the roots, is said to keep off the worms. When lime is sprinkled at the root, it must be wet either by rain or by hand. I know of no better remedy.

Mr. Wakeman.—I ought to mention that the tree in Philadelphia was annually whitewashed.

Ethan Campbell, esq.—I applied quick-lime to the roots of ten peach trees, annually, since 1839, and those trees are healthy. I planted tansey at the roots of twenty peach trees: they were not attacked by worms. The worm bores a hole through the bark at the edge of the ground; its eggs are hatched in June, and I have taken thirty worms out of the bottom of a single tree. The trees protected by tansey give me full crops of fruit (and fine, too) annually. Ten peach trees, to which I applied nothing, all died the third year.

Colonel Travers.—I planted on my farm, in Jersey, 900 peach trees. I treated them every way—ashes, lime; I cleared the roots—and had 120 left. One near my home I cultivated as I would a cabbage, leaving no grass or weeds near it; that one is a healthy and vigorous fruit bearer—*cultivation does that for it.* The tree, and all plants, must, like animals, have good and proper food. The grub-worm does not mind ashes, or lime, or salt—he will crawl out of it; and I have tried, by wrapping them in these substances, to kill them, and they don't mind it. I tried it on bots taken alive from a dead horse; the bots were not killed by it, nor by any of the articles given to a horse as remedies for bots. This animal does not die, either in or out of a horse, by being enveloped in the articles. As to the peach tree, I wrapped a bandage and a mat over that, around the body of the tree, just under the forking of the branches, yet the worm ate down to the ground. All the remedies applied at the roots of the trees were, I have no doubt, useful to the soil; they invigorate the tree, but they do not kill worms.

Mr. Wakeman.—There may be some ingredient in certain soils, which, mixed with soot, ashes, or lime, may be disagreeable to the worm. At all events, we are looking for useful results in all our inquiries. Contradiction is itself often highly useful, in bringing out the truth which we desire.

Chairman.—I have adopted the following plan for my peach trees, during the last four or five years. I bore a piece of sheet lead, about six or seven

inches wide, and place around the bottoms of the trees, putting the lower edge of the lead about an inch in the ground. I then fill the space between the tree and the lead with anthracite or wood ashes, or with sand. My trees so treated are healthy and bear well.

Colonel Travers.—Mr. Woolsey put wooden boxes around the roots of his peach trees, and filled the space between the box and the tree with charcoal; these trees, he says, lived twenty years.

Chairman.—Mr. Vose takes tarred paper, puts it around the tree, six, eight, or ten inches above the ground; takes it off in the autumn; he also gives his trees special attention; his peaches are excellent. I applied the lead plan to at least forty of my peach trees.

Mr. Townsend, of Astoria.—Being on a visit to a friend in Norfolk street, in this city, last summer, I was struck with the fine healthy look of a peach tree in the yard. On inquiry, the lady of the house told me that every spring she poured a teakettle of hot water upon the trunk of the tree, which ran down to the ground. This had been done for fifteen years, and the fruit was always good.

Colonel Clark.—I have no doubt that lime in the boxes would have a good effect; when moistened, it is powerful enough to affect the hand, and will destroy insects.

Ethan Campbell.—Lime would certainly prevent the approach of insects, I apprehend, and prevent its depositing its eggs. I recommend a sprinkling of lime once a week around the roots of peach trees from the beginning of April.

Oliver Smith.—Those insects which injure fruit deposite their eggs in the fruit itself. Lime does not reach or prevent that. When the insect is hatched, it then descends the tree and enters the ground.

Colonel Clark.—The curculio preys on pear, plum, and some other trees, but does not touch the peach. The worm which destroys enters at the bottom of the peach trees, and bores between the bark and the wood.

From the Southwestern Farmer, of July.

CULTIVATION OF FRUIT AT THE SOUTH.

We will now examine into the cost, and look at what might be reasonably counted on, as to the profit of this culture.

Fruit trees would cost, on an average, delivered on the farm, we will say 40 cents each. If planted 25 feet apart each way, 69 trees will be required, which are worth $27 60. The cost of cultivation, interest, and rent of land, will be paid for the first three years by the corn crop, so many hands not being required, and a profit realized by the sale of fruit, as well as the use of hands for the winter months at least. We will set this down, though, at only a stand off, and begin when the fruit is the only crop.

35 acres land, worth say $10 00 per acre	=$350,	interest 8 per ct.,	$28 00
Fruit trees - - 27 60 "	828,	"	66 24
A pair of choice mules and wagon	300,	"	24 00
Hire of six hands, $150 each	900,	"	72 00
Food, clothing, doctor's bills, taxes	240,	"	19 20
Ploughs, tools, &c., wear of gear, mules, &c.	100,	"	8 00
Making, in all - - -	$2,718	"	217 44

To meet this expense, and to pay interest, we will assume the following very moderate yields and prices from sales, hiring, &c.:

By 1 bushel of fruit only from each tree of the best, at only $1	$2,070 00
Food for hogs, (the selected fruit only gathered,) at $5 per acre	150 00
Hire from hands for the months of November, December, January, and February, at $10 per month - - -	240 00
Making a total cash return of	$2,460 00

Our object is to be entirely within the mark; and we think we have placed our calculation far within it. We firmly believe that six hands, &c., as above, can keep up the fertility of land, can make enough corn and meat to feed themselves, can be spared for four months at other work, and can then sell gross amount of $600 per hand.

APPENDIX No. 17.

ON MUSTARD.

From the Ohio Cultivator.

MUSTARD CROP IN OHIO—PRICES OFFERED FOR THE SEED IN PHILADELPHIA.

We have made inquiries respecting the success of our friends who attempted the cultivation of mustard seed in this State, the present season, and we learn that although some failed entirely, owing to the frosts and drought, the majority have succeeded remarkably well, considering the unfavorableness of the season, and their want of experience in the business. The following are the principal lots:

Mr. Parmelee, Duncan's Falls - - -	27 acres.
Mr. Buckingham, Putnam - - - -	9 "
Mr. Ely, Chillicothe - - - - -	15 "
Mr. Myers, Canton - - - - -	7 "
Three or four smaller lots, say - - -	12 "

Making in all seventy acres; and there may be other lots in the State, of which we have not heard. Mr. Parmelee's crop is about as good as last year—say fourteen bushels per acre. Mr. Buckingham's is nearly as good. Mr. Ely's, and the smaller lots, were somewhat injured; we have not learned the amount of the yield; probably not over seven to ten bushels per acre. This will give, for the whole amount, 700 bushels.

We have just received a letter from Messrs. C. J. Fell & Co., of Philadelphia, in answer to one from us, in which they generously say, that although the market price for seed is not well established, (and it may range lower than last year,) yet, inasmuch as they may have been instrumental in inducing some Ohio farmers to engage in its cultivation with the expectation that the same price would be given this year that was paid Mr. Parmelee last year, they now offer to pay that price (eight cents per pound in cash) for all Ohio seed that may be sent to them *of as good quality* (as heavy and clean) *as was Mr. Parmelee's last year;* to arrive at Philadelphia not later than the first of November. For seed of a less perfect quality they will pay a proportionate price; and to avoid any dissatisfaction, they offer to let the weigh-master send us samples of the lots that arrive, and have us compare with seed of Mr. Parmelee's last year's crop, and say what deduction ought to be made in the price.

The seed should be packed in good strong flour barrels, and shipped by way of Pittsburg. The cost of transportation from Pittsburg to Philadelphia is sixty cents per hundred weight.

The Messrs. Fell also inform us that they have shipped for us a box of small canisters of mustard, manufactured from Ohio seed, which we may distribute to persons engaged in its cultivation, and such others as we see fit. We will do so, with pleasure.

From the Ohio Cultivator.

SALES OF OHIO MUSTARD SEED.

Statement of the amount of Ohio mustard seed purchased by C. J. Fell & Brother, of Philadelphia, previous to 1st December, 1845; furnished at the request of the editor of the Ohio Cultivator:

R. Prouty's crop, Morgan county,	40 bags,	4,771	lbs. at	8 cents	$301 27
J. H. Seeley, " "	20 bbls.	3,580	"	8 "	286 40
H. M. Myers, Stark county,	7 "	1,470	"	8 "	103 29
One lot Muskingum co., (inferior)	17 "	3,056	"	7½ "	229 20
Sundry small lots	17 "	2,814	"	8 "	225 16
Purch'd of Goodhue & Co., N. Y.*	42 "	7,535	"	7 "	527 45
J. H. Parmelee's crop, Muskingum county, purchased through our agents, Adams, Cushman, & Co., New York	82 "	15,883	"	7 "	997 01
Total - -	225	39,109			2,669 78

This would make, in all, 760 bushels, of 52 lbs. each.

PHILADELPHIA, *December*, 1845.

DEAR SIR: In compliance with your request, we hand you the above account of our purchases of Ohio brown mustard seed, of crop of 1845, up to 1st inst. There are several lots we are advised of on the way, not yet received. The quality of several of the above lots was much inferior to Mr. Parmelee's last year's crop; but, in a market with a limited supply, we asked no deduction, except in one case, the grower preferring to send sample before sending his seed, to know what deduction from our published offer we would expect. In that case we claimed one-half cent per pound, which was satisfactory to the grower, and thus we have not been compelled to trouble you with samples for you to assess their value. We would, however, recommend farmers to clean their lands more thoroughly, and to deliver their seed in good order, fully ripened; as, in a full market, many of the crops we have taken as *prime* would fall below that quality, and of course would have to be sold at a reduction from market value of truly prime seed.

We regret that all your farmers did not take advantage of our offer, made through your paper of September 15th, but sent their crops to other markets, two of which you will observe we have purchased in New York at 7 cents, New York price. We felt disappointed that our old "pioneer," Mr. Parmelee, should not have brought his crop direct to us and obtained Philadelphia price, as we expected from the tenor of a letter we had from him in August last, that his crop would have been better than last year; as he then informed us "that he had the same land again planted with mustard seed, and had expended $250 extra expenses in cultivating it," and that "the gathering of his crop was a *four weeks' job for twenty men.*" We expected that the result of such a crop would have shown our farmers that American soil and American labor will produce profitably a crop of brown

* This seed was raised by Thomas Few, Muskingum county.—*Ed. Ohio Cultivator.*

mustard seed. You will observe that we have *only* the product of his *brown* seed. We learn that a portion of his 27 acres was planted with *yellow* or English seed, which explains why his crop has fallen off from last season. Can you learn and inform us of the result of his yellow seed? To what cause may it be attributed that he was at so great expense over that incurred by his neighbors in cultivating and harvesting the crop? We suppose probably the yellow seed was the cause; or, perhaps, the planting the seed for two years on the same land. If this latter is the case, we should recommend no farmer to do it, for they not only incur a large amount of labor, but produce a seed much inferior to that raised on land planted with it for the first time; as Mr. P.'s crop was much inferior this year to any other crop we have purchased.

We had intended to have given you the number of acres planted by each person we have purchased seed from, but we found we could not obtain it, and as the spring was so unfavorable to all crops, no certain data could be obtained from it.

Very respectfully, yours, &c.,

C. J. FELL & BRO.

M. B. Bateham, Esq.

Remarks.—We have not room nor time at present, but in our next, or the following number, we shall give some account of Mr. Parmelee's operations, and we fear it will be our duty to show that his statements to Messrs. Fell & Bro., and to others, have not all been in strict conformity with truth and fairness. It seems to have been his desire, from the first, to dissuade all others from engaging in the culture of this crop, in order that their competition might not tend to reduce his profits. We have little sympathy with such a spirit among farmers.—*Ed.*

—

OHIO MUSTARD SEED CROP—ITS CULTURE.

The amount of brown mustard seed raised in this State the past season we should judge was over 1,000 bushels. Of this we have before shown that Messrs. Fell & Brother, of Philadelphia, purchased 760 bushels, for which they paid, in cash, $2,669 78. These gentlemen were prepared to have taken a larger quantity at the same rate, had it been offered to them. The price paid by them for good seed, sent direct from Ohio, was eight cents per pound. Some that was sent to the New York market they bought at seven cents—(the average weight per bushel is 52 pounds.) Quite a number of those who attempted its culture last year were unsuccessful, owing to the remarkable character of the season, and their want of experience. We presume a much larger quantity will be raised the coming season; but we are not sufficiently informed as to the extent of the demand at the east, to judge whether any material reduction of price is to be anticipated from this increase of supply. We believe, however, that large quantities of the seed are annually imported for the Boston and New York manufacturers, and that no fears need be entertained of glutting the markets at present; though it is possible that a slight reduction of price may have to be submitted to hereafter.

In fulfilling our promise to give full directions respecting the culture of mustard seed, we offer, first, the following experiments and observations by

a very intelligent young farmer of Muskingum county, who has had one year's experience in the business, and has derived some little advantage from a knowledge of the practice of Mr. Parmelee, who resides but a few miles distant. We expect to be able next month to give a detailed account of Mr. Parmelee's mode of culture, written by himself.

On the cultivation of mustard seed.

Friend Bateham: In accordance with your request and my promise, made some time since, I will now give you an account of my last year's experiment in the culture of brown mustard seed, together with such observations and suggestions as I think may prove serviceable to those who may desire information on this subject.

The field that I sowed with this crop last spring was 10 acres; soil, a light rich, sandy loam, excepting about one acre, which was clayey—the previous crop wheat. On one-half of this field I applied, early in the spring, 100 two-horse wagon loads of manure, and 600 sheep had been kept nightly on the lot for a month previous, so that it was well enriched before ploughing.

By the 9th of April the soil was ploughed, harrowed, and bushed smooth, ready for sowing. I then with a small hoe made drills or trenches one inch deep and two wide, two feet apart; then, with a cup of seed in one hand, I sowed it by taking as much at a time as could be held between the thumb and finger, and scattering it along the drill, as near as I could judge, one inch apart. (I used about a quart of seed to the acre.) A little practice enabled me to drop the seed quite regularly, and almost as fast as a horse would naturally walk before the plough, or at the rate of two and a half or three acres per day. The seed was covered to the depth of one quarter to one-half inch, by having a boy draw a brush over the drills.

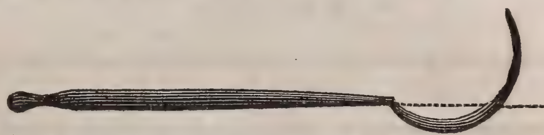
The weather being very dry, and also cold, the plants did not make their appearance till 10 or 12 days after sowing; they then grew very rapidly for about two weeks, when the drought again stopped them for near a month. During this time the ground was kept clean of weeds by hoe and hand. The first time cleaning was 12 days' work. To have done it in the best manner would have taken 18 days.

Being somewhat at a loss to know whether to thin my plants or not, I rode down to Mr. Parmelee's great field for information. I there found that his plants were at least a week ahead of mine in growth, and that they were standing more than twice as thick in the rows. He had also made every alternate row one foot apart instead of two, so that he had about three times as many plants as I had to the same ground.

After the first cleaning I tried using a shovel plough, but it covered weeds and plants together. I then made a small cultivator, having five teeth, like little shovels, the size of a man's hand; this was the thing required, as it cut off the weeds and mellowed the soil without disturbing the plants. With this I went over the field three times in two weeks; then followed with a shovel plough, twice to a row, with boys to pull weeds out of the rows and uncover any plants that got buried. This left the field clear of weeds, and finished the work till harvest.

Not being quite certain as to the proper time or best manner of harvesting the crop, I again went to Mr. Parmelee for information; I there found that he delayed cutting till the pods were dead-ripe and the stalks nearly

dry. It was then cut with sickles—[the kind with *smooth edges*, sometimes called grass sickles in this country—Editor]—and laid in small heaps for several days, to dry. I waited till my crop became sufficiently ripe, and had some knives or sickles made for the purpose, of a form that I found was quite an improvement on those sold at the shops. I give you a rough drawing of one, which will explain it.



The handle is two feet in length, and of size to suit the hand. The blade resembles a sickle, but is less curved. The edge forms a regular half circle, say 12 inches in diameter, and the shank is so formed that a straight line drawn lengthwise of the handle would strike the edge at the middle of the curve, (as shown by the dots in the above cut;) by this means, when using the knife, it is drawn with a sloping cut, instead of square across the stalks, as is usually the case with the common sickle, thus making easier work and causing less jar and waste of seed in cutting. At first, I cut during all the working hours of the day; but perceiving that the seed shelled out much worse after the dew was off than before, I hired half a dozen hands to work for me at six and a quarter cents per hour each morning, from daylight till the dew was off, during which time we cut about an acre each morning—costing about $1 50. The cutting was done from the 1st to the 10th of August.

After leaving the stalks in the field till perfectly dry, I hauled them to the threshing floor on a sled, having a frame on top covered with canvass, 14 feet long and 12 feet wide, so as to catch the seed which shelled out. The threshing floor consisted of canvass, 12 feet wide and 20 feet long, surrounded on three sides with a strip of brown muslin, two yards wide, (supported by stakes.) At the open end of this floor a sufficient number of sheets were spread to contain the stalks as brought from the field. In threshing, the stalks were laid head to head, in two rows along the floor, 8 to 10 inches thick, then beaten with green hickory poles, 10 or 12 feet long, (we found them better than flails,) till free from pods and seed. Two men threshed in this way, and raked off the coarse chaff, as fast as a man and two boys brought the stalks on the sled, the distance varying from 10 to 40 rods. We threshed in a week the product of the field, amounting to about 50 bushels. After taking off the coarse chaff, which was easily done with a common rake, the seed was spread on a dry floor, where it lay for a month, being stirred three or four times a week to facilitate its drying; (the chaff and dust which remain prevent it from heating or becoming mildewed.) When thoroughly dried, I cleaned the seed with a common fanning mill, passing it through twice, and the tailings three or four times.

Observations.—The improvements that have been suggested to my mind by this experiment, are the following:

1st. That the crop should be sown on sandy bottom soil, which is mellow and not liable to suffer from drought; and sufficiently rich to afford nourishment to the plant and seed without the application of manure, as I have discovered that manure has a tendency to cause an excessive growth of stalks, with but little seed.

2d. That it is better to have the rows arranged as Mr. Parmelee does—the spaces alternately 1 foot and 2 feet wide; and the seeds should not be dropped in a single line or row in the drills, but scattered along so that the young plants cover two or three inches in width in each row, thus:

××

2 feet space.

××

1 foot space.

××

This will require about two quarts or three and a half pounds of seed per acre. Standing thus thickly, the stalks will be smaller and shorter than when thin, but a greater amount of seed will be obtained from the ground without any additional labor.

3d. It should be sown as early in the spring as the ground can be got in good order. Spring frosts will not injure the plants, and an early start will do much to protect them against injury from drought.

4th. The utmost attention must be given to killing the weeds as soon as they make their appearance, and keeping them out of the crop during its growth; otherwise the seeds of weeds will become mixed with the mustard seed, and greatly injure its value.

5th. After harvesting the crop, the ground should be thorougly harrowed, which will cause the shelled seeds to vegetate. The plants will grow till frosts, when sheep should be turned in to eat them off. If this is not done, the mustard will be troublesome to any succeeding crop; and even with this precaution, some will appear the next year.

Yours, &c.,

PHILE.

PUTNAM, O., *January* 22, 1846.

—

MR. PARMELEE'S STATEMENTS EXAMINED.

In our January number we intimated that, in our opinion, some of Mr. Parmelee's statements in regard to the culture and sale of his mustard seed have not been in strict conformity with truth and fairness. We greatly dislike to have any thing to do with personal disputes and accusations—it too much resembles the conduct of partisan editors to suit our taste; but, in the present case, justice to honorable friends, to ourselves, and to a large number of our readers, seems to demand a few words from us in reply to statements made by Mr. Parmelee. Let us hear them.

The first is a communication in the Zanesville Gazette, as follows:

Messrs. PARKE & BENNETT: Having observed in a recent number of your paper, and in others, notices respecting the cultivation of mustard, the tendency of which seems to be to get up a mania on this small article amongst cultivators, and to tempt to disastrous enterprise, I think it not amiss, for one, to hand in to you my experience in that way the last season.

I planted twenty-eight acres with brown, and two acres with white mus-

tard seed. Of the former, the yield was 305 bushels, and of the latter, 15 bushels; in all, 320 bushels from 30 acres.

The expense of the crop, delivered in New York, was $1,089. For 289 bushels I received $1,117. The article being plenty, owing to a great influx of foreign seed, and most of it very beautiful and of superior quality, I was obliged to submit to a reduction of one cent per pound from the price obtained last year. For the white mustard seed there was no demand. One cultivator from the northern part of New York, with a large lot of some hundred bushels of white mustard seed, and a beautiful article, could not effect a sale of the whole at five cents per pound, which would be at the rate of two dollars and fifty cents per bushel.

Comparatively, I consider the result in my own case fortunate, as several undertakings of the same kind around me proved entire failures; owing, I judge, to the neglect of seasonable and thorough tillage.

I have no doubt but the farmer who should apply the same labor in the careful drilling and hoeing of wheat, upon the same land, which he would find it necessary to expend upon the same number of acres of mustard, would find himself much better compensated.

J. H. PARMELEE.

Duncan's Falls, *November* 28, 1845.

The next is an extract of a letter written by Mr. Parmelee to Messrs. C. J. Fell & Brother, of Philadelphia, in August last, inquiring whether they wish to purchase his crop of seed. After stating that the quality of the crop is about the same as last year, or superior to it, he says:

"Appropos, while I write—and perhaps you will doubt it—here comes an agent from a house in Boston, proposing to buy my crop. He will give me eight cents per pound, less the cost of transportation to Philadelphia. I told him that, as we had some dealings, I preferred to sell to you, and that perhaps you were expecting the offer; and that I thought you would give me half a cent more a pound for an article that you know to be well saved, and not likely to sweat and heat. I want that much more to compensate me for extra trouble on account of the season. * * * He will call again. It may not be amiss to say, that the ingathering of my crop is a four-weeks' job for 20 men, and three weeks afterwards a man must be employed to shovel it up thoroughly, every day, as it lays in the chaff."

The letter of which the foregoing is a part is the one to which allusion is made by Messrs. Fell & Brother, in their communication published in our paper on the first of the past month. A full copy of the original has been furnished us, with a number of others relating to the same subject, by the Messrs. Fell, at our request.

This letter and the article from the Gazette we think are characteristic of their author. They are evidently dictated by the same spirit that induced him, a year ago, to complain bitterly of the Messrs. Fell for allowing any thing to be published respecting his large and profitable crop of mustard seed, and also of us for giving information respecting the mode of culture, &c., through the columns of our paper; thereby inducing a number of others to compete with him in the production of an article for which our country has hitherto been, and is still, mainly dependant on Europe! Let us now briefly examine one or two of his statements:

He says, in the Gazette, that the yield of his recent crop of brown seed was 305 bushels, and that for 289 bushels he received $1,117. Now, by

referring to the table of Messrs. Fell & Brother in our paper of last month, it will be seen that they paid him, through their agent in New York, for 15,843 pounds, (305½ bushels,) at seven cents per pound. (This would amount to $1,112; not $997, as stated erroneously in the table.) We have also a copy of the letter of the agent in New York, showing that the whole lot (82 barrels) of Mr. P.'s brown seed was purchased by him and shipped to Philadelphia.

Again: He says he was obliged to submit to the reduction of one cent per pound on the previous year's price, (8 cents,) owing to the article being plenty, and a great influx of foreign seed. This is sheer *gammon*, and contrasts finely with the story of the Boston agent offering him eight cents per pound. Besides, our readers are all aware that Messrs. Fell & Brother made a standing offer, through our columns, of eight cents per pound for all good Ohio seed that might be sent, if shipped direct to Philadelphia; and the only reason why he and one or two others were obliged to accept of a lower price was, *because they chose not to comply with this liberal offer, but took their seed to the New York market, and, after trying in vain to obtain a higher or as high price for it there, offered to sell it to the Messrs. Fell at the price offered by them in Ohio;* but, like high-minded and honorable men, as they are, they very properly told them, since they had not seen fit to comply with their offer, but had taken their goods to other markets, they might sell them in those markets for whatever was then and there the market price. Another reason, we are informed, why Mr. P. did not receive a higher price for his seed, was, its quality was much inferior to his previous year's crop; part of it being unripe, and a part of it sprouted. So far from an unusual influx of foreign seed having caused a decline of price, it will be seen, on referring to our paper of January 1, the Messrs. Fell expressly declare that the supply in market was limited!

We come now to the extraordinary statement, that "the ingathering of his crop was a four-weeks' job for 20 men." To show how much truth there is in this, it is only necessary for us to say that we have recently seen and conversed with several of the men who were in his employ during the whole time, and they informed us that 20 men were only employed for 10 or 11 days, then 12 to 16 men for 9 or 10 days, then 4 men for 5 or 6 days in raking and shovelling the seed; making in all about 380 days' work, or 100 less than stated by Mr. P. Then, too, it remains to be shown what kind of days' work these were. We learn that the laborers were all Germans, who reside at Taylorsville, seven miles distant from the mustard field; that they had to row in a boat that distance down the river, and back, each morning and evening, so that their usual time of commencing labor was 8 o'clock, and of leaving, 4 to 5 o'clock; thus losing, as all must perceive, the best portions of summer days for labor. They were paid at the rate of 50 cents per day, dinners found, or 56 cents without dinners.

APPENDIX No. 18.

ON THE CULTURE OF THE MADIA SATIVA, A NEW OLEAGINOUS PLANT.

[Translated from the Journal des Connaisances Usuelles et Pratiques for 1841, by E. Goodrich Smith, of the Patent Office.]

We reply to the question addressed to us on the subject of the usefulness of the *madia sativa*, by the following note:

The plant called *madia sativa* is a native of Chili. It was formerly known under the name of *madi;* it belongs to the dycotyledonous plants, with corymbiferous flowers, and of the class and order *diognesia polygamia superflue.* There are three species noticed, which are probably only varieties of the same type, viz: the *madia sativa*, the *madia mellosa*, or wild madia, and the *madia viscosa.* This plant has been cultivated from time immemorial, in Chili, for the sake of its oil, which, in the preparation of food and for economical purposes, rivals the olive oil, although it has a less agreeable taste than this latter.

The root of the plant is a tap root, whitish; the stalk is herbaceous, fibrous, branching, about the height of a metre to a metre and 90 centimetres; it is furnished with numerous alternate leaves, *linear lanceolate*, pointed, very perfect, from 10 to 15 centimetres in length, resembling those of the rose laurel—of a deep green, covered, as well as the stalk and branches, with short, whitish, coarse hairs; the flowers are yellow, nearly sessile, aggregate at the extremity of the branches, or in junction of the leaves to the stem; the calyx is spherical, egg-shaped, hairy, with small linear leaves; the flowers are numerous, hermaphrodites, three-toothed; the seeds about a centimetre and a half in length, covered with a blackish thin skin, and which becomes gray on being dried, convex on one side and flattened on the other; in this covering there is a bitter principle, which imparts to the oil of this seed a disagreeable taste for persons not accustomed to it.

The *madia* imported from Chili by the Jesuit Father Feuillé had been already cultivated in Europe about the year 1760; but its culture was abandoned, doubtless because at that period the plants which required careful cultivation were little known in general culture.

The last year, new efforts have been made to introduce into our agriculture this oil plant. These attempts have best succeeded in Germany; and since then, the agriculturists in the east of France have, in various places, sought to introduce it as a plant more easy to cultivate than the colza, rape, or poppy.

The advantage offered by the *madia* is, that it is not difficult in the choice of soil, remains only three months in the ground, and can therefore be sown as late as 15th May—a very important particular.

The oil of this plant is rich, of good taste when fresh and cold-pressed, after a slight washing of the seed with acidulated water; when used for the manufacture of soap, it makes a solid soap; it burns well, and is as good for cooking as olive oil.

Culture.—The period most favorable for sowing the *madia* in France appears to be from the middle of April to the 20th of May; it is sown broadcast, in a well prepared mellow soil, the quantity of seed being 10 kilogrammes to a hectare.

As soon as the plant is sufficiently high to be easily distinguished, the seed is thinned out, and then, by pulling up at the first hoeing, not more than one plant is left for 28 centrimetres in all directions. After a month, it receives a second hoeing; and a third, too, if necessary.

The seed springs up in about 10 to 12 days.

The third hoeing is an expense and practice which is very useful, as it consolidates the plant and gives it a new force, and causes it to seed.

While this hoeing is going on, the plant, just before it flowers, exhales a peculiar noxious, disagreeable odor, and a viscous greasy matter exudes from it similar to chorophylle, and which sticks to the clothes of the laborers; it is removed with difficulty—ley only can make it disappear.

Some have sown it in a hot-bed, and pricked it in 33 centimetres apart. This method is longer and more troublesome, but has the advantage of a remarkable increase in the abundance of seed.

Harvesting.—The harvest takes place 90 to 100 days after it is sown; the moment is chosen when the flowers appear to be well furnished with seed, for they bear seed while not ripe, and before the flowers have disappeared. The seed should be gathered after the plantation has been examined and the flowers opened; a part of the seed not ripe grows better by drying the plant after cutting the stalk.

The plant should be cut rather than pulled up; it may be cut either with sickles or scissors, as is done in pruning trees. The stalks are placed in bundles, joining them head to head, and inclining towards the foot.

When the plant is dry, it is placed on vans, to carry it to a cart provided with a cloth. All these operations must be performed with care, for the loss of the seed lessens the profits of its cultivation.

If the plant has been well cultivated and gathered carefully, from 13 to 1,600 kilogrammes of seed are obtained from a hectare.

Birds and poultry are delighted with the seed; it is necessary, when ripe, to keep them away, for they destroy more than they consume.

When the plant is got in, it is allowed again to dry before the last seeds are ripe, that they may be more easily detached by threshing.

The odor which is exhaled, and yet more the hairs which are on the plant, prevent a careful threshing, because the operations are inconvenient; it is necessary, therefore, to watch with attention this work.

The seed is exposed in a heap in the granary, where it soon takes a deep gray color. It produces, in that state, nearly 28 kilogrammes of oil to 100 kilogrammes of seed. A hectolitre weighs from 50 to 51 kilogrammes.

The oil, when expressed cold, is from 13 to 16½ kilogrammes for 100 kilogrammes of seed, and, when expressed hot, from 11 to 12 kilogrammes for 100 kilogrammes of seed.

On the extraction of the oil.—The oil of the *madia*, very rich and tasteless at first, leaves a taste afterwards which is very disagreeable: a very simple and convenient method of taking away this taste of the oil, which is to be used for food, consists in washing in warm acidulated water the seed of *madia*.

Method of obtaining the oil of the madia sativa, without its bad taste.—To water of the temperature of 40° to 50°, (probably Reaumur,) is added a

centiéme of sulphuric acid; the grain is washed in it, then rinsed off with clear water, to take away all the acid, when it is left to dry, in order afterwards to extract the oil. Obtained in this way, the oil has no other taste, and is good for using with food, and very superior to nut, poppy, colza, &c., oil.

To give it the taste of olive oil, we have only to add 1 kilogramme of olive paste, free from water, in 50 kilogrammes of the madia oil, and filter it after a month of maceration; then it may be used for sålad, so as to deceive amateurs. This oil burns well: it lasts longer than that of colza oil, and is easily purified by washing in acidulated water.

From what has been said, it may be concluded that it is profitable to cultivate this plant, which is only three months in reaching its entire development; which, in the ground, is exposed to none of the chances of the colza, so difficult to cultivate, so fearful of the frost, and so often destroyed by the fly, which never attacks the *madia*.

If a hectare produced no more than 1,200 kilogrammes of seed, and 400 kilogrammes of oil, this plant would afford a large profit to the cultivator.

We hope that this notice will engage the attention of cultivators who have not yet attempted the culture of this plant, and induce them to make the trial.

The stalks, &c., of the madia cannot be used except for burning or to make a good manure by their decomposition. M. Bailly de Villeneuve thus estimates the expense of the culture of a hectare, [1¼ acre:]

Rent of a hectare	48	francs=	$9 60
Laborer	8	"	1 60
Three hoeings, at 24 francs=$4 80	72	"	14 40
Harvesting	10	"	2 00
Cartage	6	"	1 20
Threshing, 6 days' work, at 1 franc—50 cents, including all	9	"	1 80
Manufacture of the oil for 30 hectolitres	60	"	12 00
Seed	2	"	40
	225	"	$45 00

For which is obtained 225 litres of good oil—more than 50 gallons.

The quantity of the oil obtained, in this account, seems to us too small.

APPENDIX No. 19.

BENE PLANT.

NEW YORK, *January* 27, 1846.

DEAR SIR: Your letter of 21st came to hand on Saturday; but being much engaged, I had not leisure to give the subject-matter that attention its importance required.

The bene plant was introduced into the West India islands from Africa, and subsequently in some sections of the United States. South Carolina and Georgia, I believe, are States in which this plant has been cultivated.

The seed yields a great abundance of oil; and so great is the product, that I am unwilling to state how much oil is produced from a hundred pounds of seed, fearing the proportion would appear so large as to be almost incredible.

The plant is useful as a medicine, and I enclose a small printed sheet which I obtained from Mr. Thorburn's seed store, for your information on that head.

More than twenty years ago I purchased several casks of the oil of the bene seed, from Messrs. Suydam & Wyckoff, merchants, (then doing business in South street, New York,) made from seed sent to that house from a correspondent in Georgia, or South Carolina. The seed was sent to a linseed oil mill in this vicinity, where it was crushed and pressed. A portion of the oil was obtained by cold pressing, the residue by hot pressing. The cold-pressed oil was light colored and flavorless; the hot-pressed was a little colored, and had the peculiar smell of nut oil. I purchased this oil at a low price, for the purpose of making soap; but, finding it contained too much mucilage, I was induced to make sale of it to the house of Clark & Co., druggists, Maiden Lane, New York. The Messrs. Clark paid me two dollars per gallon for the cold-pressed, and 90 cents per gallon for the hot-pressed oil. Mr. Wyckoff used the cold-pressed oil for table oil, and found it excellent.

The plant is easily cultivated, and yields abundantly in seed, but requires a warm latitude.

I will send you, the first opportunity by private hand, some of the seed for distribution; and I will examine among my oil samples for a sample of the oil, which I will also send you, if I find, after being kept on hand more than twenty-five years, it is a good sample of the article.

Yours, with great respect,

EBEN. MERIAM.

Hon. E. BURKE.

DIRECTIONS FOR USING THE BENE PLANT—[SESAMUM ORIENTALE.]

Take eight or ten of the leaves, wash the sand off, and let them lie twenty minutes in a half-pint tumbler of cold water. A thin jelly will soon be formed, without taste or color, which children afflicted with the summer complaint will drink freely. A little sirup may be added to tempt the taste. It has been supposed that the lives of a great number of children have been saved by it, wherever it has been used. In some instances it has been administered with perfect safety to infants only a few days old.

NEW YORK FARMERS' CLUB.

DECEMBER 2, 1845.

A communication was read from Paul Duggan, esq., Professor of the Arts of Design at the Institute, now at Curaçoa, transmitting with it a parcel of bene nuts. Mr. Duggan states that the botanical name of this oil nut is guilandina moringa of Linnæus. It is of the family faguminosa. It is a native of the Indian Archipelago—is grown also in some parts of the British India peninsula; that it was introduced many years ago into Curaçoa, but only lately considered of value. The trees from which these nuts were taken are not fully grown, being only three years old. The oil of this nut is slightly colored—has little smell. It should be free from color and without smell.

The oil from the bene nut does not congeal—is excellent for the movements of the watch, and for machinery. The abraded parts of machinery moving in it are precipitated in it; and when applied to paper or other substances, this oil will so perfectly evaporate as to leave no residue. —*New York Farmer and Mechanic.*

BENE OIL.

To the Editors of the New York Farmer and Mechanic:

GENTLEMEN: The oil of bene seed is a valuable article. The seed yields very abundantly in oil, and the plant is of easy cultivation.

Some years ago, Messrs. Suydam & Wyckoff, then doing business in South street, received a large quantity of bene seed from one of their correspondents in South Carolina, or Georgia. The seed was sent to an oil mill here for pressing. The oil made from this seed was part of it produced by cold pressing, and the residue by hot pressing. The hot-pressed oil possessed the flavor of nut oil, and was slightly colored. The cold-pressed oil was colorless and without smell, sweet, and was a good table oil. The oil was unsaleable here, and I purchased the entire lot at a low price; but finding that it was not a good oil for making soap, in consequence of the mucillage it contained, I sold it to the druggists. Messrs. Clark & Co., then doing business in Maiden Lane, purchased the cold-pressed oil at two dollars per gallon, and the hot-pressed at 90 cents per gallon.

I noticed that a sample of bene oil had been presented at the last meeting of the Farmers' Club, which prompts this communication.

I have, among my oil specimens, the expressed oil of the mace, the poppy seed oil, oil of cotton seed, oil of the palm, cocoanut oil, ground nut oil, oil of the olive, and oil of the castor bean. These oils are variously affected by cold, and all of them become rancid by age and change of temperature.

The poppy seed oil is often sold for olive oil; but for many purposes it is unfit for use, in consequence of the mucillage it contains. Place this oil upon a heated iron plate, and it will, in evaporating, coat it with a varnish; it is, therefore, unfit for oiling wool.

Yours, &c.

E. MERIAM.

APPENDIX No. 20.

BROCCOLI AND CUCUMBER, &c.

CULTIVATION OF BROCCOLI.

ASTORIA, *January*, 1846.

SIR: The cultivation of this most delicious and beautiful vegetable is less known and less attended to in this country than its merits deserve. It is just as easy to grow as a cabbage, and comes into use when most of the summer vegetables have passed away.

Any soil that will grow a cabbage, or a cauliflower, will grow a broccoli. It requires, however, to be richly manured; and by far the best manure is from the cow-yard. This is equally true with respect to the cultivation of every species of cabbage and lettuce. All these plants feed grossly, and will not refuse even fresh cow manure. It is well to know this fact, because sometimes, in the absence of other manures, it may be convenient, if not absolutely necessary, for the gardener to use it; and if he had his choice, he could not select better. The red cape broccoli seems most congenial to this climate. The seed should be sown about the middle of May, in a shady border, if convenient; for the plant is naturally hardy, and thrives best in cool rather than in hot weather. So soon as the plants shoot up to the height of two or three inches, they should be planted out in rows six inches apart, and four inches in the row. This will give them ample space to grow straight, stocky, and strong. When grown to the height of seven or eight inches, they will be of suitable size and strength to transplant into the ground prepared for them, fresh manured, and fresh dug a spit and a half deep, with the manure turned in as near the bottom as convenient, to guard against the drought of August and September. The roots are sure to find their food. Give the plants a liberal space in rows three feet asunder, and three feet in the rows, for the leaf grows longer though narrower than the cabbage. The last season I planted out my broccoli upon the same ground that I used in growing cauliflowers; and, by fresh manuring and fresh digging, obtained two full crops. They will begin to fruit the beginning of October, and continue fruiting until the middle of November.

Dry as the season proved, I grew last year at Astoria, New York, the finest broccoli I ever saw. Many of the heads measured two feet seven inches in circumference, with a fine solid compact pulp. I attribute this unusual growth and healthfulness of the plants more to the character of the manure and depth of digging than to any other cause. The natural moisture of the manure was checked in its evaporation by its depth in the earth. I believe there was not a plant that did not fruit. If the main stalk, after cutting off the head and trimming the leaves, be left standing, fresh stems with small heads will shoot out round the top, very fine and tender. If the autumn proves dry, fork up the earth between the rows. It is far better and less labor than to use the water-pot. A skilful gardener will watch his opportunity, and seize a wet day for transplanting; but, if he doubts the continuance of wet weather, it is a good and always a successful plan to mix mould and manure in a bucket of water, and immerse the

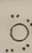
roots of the plants before setting them. Follow this plan, and you will not lose a single plant, wet or dry. Your obedient servant,

JUNIUS SMITH.

Hon. E. Burke.

[Extract of a letter from James Coppuck, dated Mount Holly, N. J., Jan. 1, 1846.]

"Whilst writing, I would intrude by introducing the following to your notice. Last fall I planted a few cucumber-seeds in the following way, as directed by a friend, with no other view than the mere product of fruit:

"I dug a circular pit about 8 or 10 inches deep, $2\frac{1}{2}$ feet diameter; this I then filled to within 3 or 4 inches of its top with a mixture of one-third earth and two-thirds *hog-pen manure*, over which I placed an inch or two of earth, forming a concave hollow; around the periphery I planted a few seeds thus,  as shown by the dots around the circle. When the plants had grown to a proper size, I then placed around the bed a support of sticks diverging from the centre in a vertical direction of about 35° or 40°, thus,  so that a person might readily pass around and under the vines to collect the fruit. I observed that the vines running south produced by far the most fruit—north, but few; whilst those running east and west, each an intermediate proportion. This was steadily so from their flowering until frost.

"One bed of this size will produce from 8 to 12 and 20 cucumbers a day; and, if the fruit is not suffered to get old on the vines, it will bloom and keep vigorous the entire summer. In dry weather pour a bucket of water in the centre of the pit."

ON LETTUCE.

Hopewell, near Fredericksburg, 1846.

Dear Sir: I have enclosed you a package of lettuce-seed, which I have cultivated for several years, and have so improved the quality that last year I succeeded, notwithstanding the drought, to grow them to measure $13\frac{1}{2}$ inches in diameter, hard heads, very white, and *very* tender. I have tried a great many kinds of lettuce, but have found none to come anything near the quality of this kind. To grow them good, they must be planted on land *recently* manured with the strongest manure that can be obtained, (fresh horse-manure is the best,) well incorporated with the earth.

I have also sent you three seeds of the African pumpkin. I had a few seeds sent me last year, (spring,) but, by neglect, they were not planted until late in the season, and consequently had not time to mature its fruit. The vine grows very large—*leaves* measure 2 to $2\frac{1}{2}$ feet across; and I think this kind will prove to be a great acquisition to the pumpkin race. The seeds sent you are a part of those sent me from Africa: the seed did not mature in those I raised last year. Cultivate like the common pumpkin.

I should be glad, if you have any seed to spare, to receive such at as early a date as may be convenient. I am taking a great deal of pains to collect and prove all the fine and rare kinds, and shall next fall have a supply to send you for distribution. Truly yours,

H. R. ROBEY.

Hon. Edmund Burke.

APPENDIX No. 21.

INDIGO.

From the American Agriculturist of November, 1845.

CULTURE OF INDIGO.

It being quite out of the question to make a living in my neighborhood by cotton planting, I am turning my attention to something else. Sugar is the first article to attract attention, as it is extremely profitable; but it requires a fortune to begin with, and is out of my reach. Indigo, I have thought, might answer; but, from a small trial I have just made, it does not appear so. My little trial, it is true, is not a fair test; but, such as it is, you shall have it.

I planted, early in the spring, a piece of new ground in indigo, on which nothing had ever previously been planted; and after leaving plants enough to give me seed for another year, cut and measured a piece of the following dimensions, viz: 1,176 links of the English surveyor's chain, by 150 links, which, multiplied into each other, gives 176,400; dividing this by 100,000, the number of square links in an acre, it gives somewhat more than one acre and three quarters. From this I cut weeds to fill four troughs or vats, which, after being filled with the weed, held 120 gallons of water, which, after steeping about seven hours in the daytime, or eleven hours at night, I drew off into another vat, and beat from forty to fifty minutes, when I found that it would readily settle, and put in the lime-water (about one quart) for that purpose, keeping the froth down, of course, with oil. In this last trough or vat I had two spigot holes, one above the other, and from one I allowed the far greater part of the water to run, and then drew out the indigo and the remainder of the water in a rather coarse cotton cloth, placed in a box with holes in the bottom of it, the cloth acting as a strainer, and the holes in the bottom of the box letting the water run from the indigo. This I put in a press for twenty-four hours, in a wooden frame placed on a bench, with grooves, or rather saw-cuts, across it, to allow the remainder of the water to run out. I now took out the indigo, still wet, cut it in pieces, and dried it in the sun; out of the sun it appeared to be impossible to dry it. When the indigo was taken out of the press, each making averaged about seven pounds, or twenty-seven pounds in the whole. I have just now weighed it, when perfectly dry, and the whole weighs only three pounds. Now, at this rate indigo would be rather worse than cotton; but I have not given it a fair trial. It was planted too wide apart, and not cultivated as it ought to have been, in consequence of the cold and wet spring drawing my attention to work of more consequence. A neighbor of mine, an old Indigo planter, has just one acre of ground in indigo; he has cut his first crop from it, and assures me that he has made fifty pounds from it, and expects twenty-five pounds more from a second cutting. From the samples of indigo I have seen bought by my neighbors, most of whom spin and weave, I am quite certain that it is much adulterated with some other substance; and they assure me that it is sometimes so bad it will not dye at all. Mr. Landry, my neighbor above spoken of, has sold what little he

made at $2 25 per pound, or half a dollar per pound more than the usual retail price of the imported indigo. I send you samples of both his and mine, which I will thank you to give to some dyer, to ascertain the value of it in your market, and also a few small lumps of blue, which is three parts starch. Mr. Landry says that I do not beat my indigo long enough, and lose by it in that way, and that I sun it too much, and make it too light. He smokes his, but I cannot clearly comprehend what good that does.

It appears to me impossible to take in and secure a crop of more than one and a half acre to the hand, and this planted at three different times, that it may ripen gradually, and not all at once; and, indeed, not so much in a wet summer, of which we have too many, sometimes raining for sixty days, with no more than two or three days' intermission, which nearly destroys cotton crops, and might be even worse on indigo.

The purport of this letter is to elicit a detailed and full account, from some practical indigo planter, of the whole process of making it, as well as to ascertain the price at your market of such qualities as I send you. All the accounts that I have seen on the subject are meagre indeed; nothing at all calculated to make an indigo planter.

PHILIP WINFREE.

New River, La., *August*, 1845.

We have but recently received the samples of indigo spoken of above; and, not being acquainted with any practical cultivator of it, we handed them over to Mr. Partridge, an extensive dealer in dye-stuffs in the city for information. The following is his reply. It must be premised that he puts down the *wholesale* prices the samples might probably bring in the city; whereas Mr. Winfree speaks of *retail* prices in the interior of the country. We shall feel grateful to any of our readers who can furnish us further information on the culture of indigo in this country. We do believe it would pay the southern planter well, if he only knew the proper method of cultivating it.

Dear Sir: I have examined the samples of indigo sent you by P. Winfree, esq. The fine samples mixed with starch may be worth about 30 cents per pound for blueing clothes when washed. The squares sent loose in the box, and full of white, or rather drab colored specks, might sell at 50 cents per pound. The sample from Mr. Landry could scarcely be sold at 50 cents, but might bring more, if, on trial, it should work better than its appearance indicates. The sample of Mr. Winfree is much inferior to all the others, and I much doubt if we could persuade a regular consumer to buy it at any price, as it has evidently been injured in the making.

The best violet and blue Bengal indigo is selling at about $1 40 per pound. We are selling prime consumable quantities of Bengal at from $1 15 to $1 20. Prime Guatemala is selling at from $1 to $1 10 per pound; one pound of the latter being worth at least twice as much as any sample sent in the box, judging from appearances. There is certainly something wrong in the manipulations of all these indigo makers.

Query 1st. Do they not leave the plant to pass its period of maturity before cutting? Mr. Dalrymple informed me that it should be cut when in full flower; another East India maker, that it should be cut before the flowers come out in blossom. They all agree that if left too long, the indigo produced will be less in quality and of inferior quantity.

Query 2d. Do they not cut the plant too soon after rain? for it appears that it should have several days of dry weather before cutting.

Query 3d. Do they not ferment too much, or too little? In making indigo in the East Indies, they judge of the steeping by the color and the smell of the liquor. Sometimes it is complete in six hours, at other times it requires twenty hours. This variation in the fermentative process may often arise from the state of the weather before cutting; for, if moist from rain, the fermentation will certainly proceed more rapidly than when the weather has been previously dry for several days. It may be influenced also from the state of the plant when cut; whether it has arrived at full maturity, as described by Mr. Dalrymple, or whether cut before bursting into flower; as the latter would undoubtedly ferment more rapidly than the former, the condition of the plant being more succulent. The state of atmosphere during the process of steeping must have a decided effect in either hastening or retarding the fermentation; for when it is clear and dry, the fermentation will not be so rapid as when it is hot and moist. It is in this operation that more skill is required than in all others; and unless the operator understands this point, and attends particularly to it, no profit can be derived from the manufacture.

Some of the best indigo I ever used in England was made in South Carolina, by the late General Wade Hampton, who informed me by letter, many years since, that the art of making was lost in this country. I presume, however, that it may be recovered again by repeated experiments. In Mr. Winfree's letter he states that the seasons are often very wet, it sometimes raining for sixty days in succession, with only two or three days intermission; now such a season must be too moist for the indigofera.

With regard to the beating, it must be continued until all the green particles have become sufficiently acidized to precipitate; for whatever portion remains in a green state will be lost, this portion being soluble in water.

WILLIAM PARTRIDGE.

Mr. Allen.

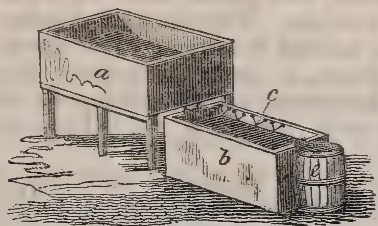
From the American Agriculturist, February, 1846.

CULTURE OF INDIGO.

I noticed some letters in your last volume upon the culture of indigo; and as it is one of the subjects to which you originally invited my attention, I will proceed to state, as shortly as may be, what I learned in my youth upon this matter. My father grew indigo, as a crop, until I was sixteen years of age, and was considered to have made a good article.

The laborers are divided into gangs of ten, and are expected to cultivate 30 acres to the gang. The soil should be moist, whether loam or clay, well drained, and divided by small trenches 24 feet apart. The indigo is drilled 14 inches between the drills. The seed is very small, and should be soaked for a night, then mixed in dry ashes or sand, and sown along the drill carefully and regularly. Four quarts of seed, carefully sown and well mixed in ashes, are enough for an acre. In this climate the seed should be sown in the first week in April. When it first comes up, it resembles white clover or lucerne, and should have the grass carefully picked by hand from the drill. When it is an inch or two high, it must be weeded

between the rows, and the soil loosened about the roots. Three weedings are enough before the first cutting, which should commence about the first week of July, or as soon as the indigo begins to throw out its bloom.



Indigo vats.

For every set of ten hands, there sould be what are called a set of works. These formerly cost about $100 or more, and were—a vat or tank, made of plank two inches thick, well joined. This vat (*a*) is 20 feet square, stands upon posts 4 feet from the ground, and is kept tight by wedges driven into the sleepers upon which the plank rests. The vat is 3 feet deep, and is called the steeper. Along side of it is another vat, (*b*) 20 feet by 10, occupying the space between the bottom of the steeper and the ground, into which the water is drawn in which the indigo is steeped when ready to be beat, or churned, as we may say. At the end of this last vat, a small tank or cask (*e*) must be placed, to furnish lime-water in the process of beating. The liquor is drawn from the steeper (*a*) by a spigot at the bottom of the vat along the beater, (*b*.) Lengthwise of this is stretched a beam, (*c*) resting on its upper ends, and revolving on journalls, and furnished with cross-arms, to the ends of which are fixed open buckets without bottoms, containing about two gallons each. Two men, standing on this beam with a handspike fixed to the long beam, alternately plunge the open buckets right and left, thus churning the liquid until it begins to show a blue fecula, which is produced by small quantities drawn from the lime cask, (*e*.)

Indigo is so easily injured by the sun after being cut, that the cutting begins and ends in the afternoon. As it is cut by the common sickle or reap-hook, it is carried either to a shed or conveyed and placed immediately in the steeper, where it is carefully spread. When the indigo is placed in the steeper from 2 to 2½ feet deep, pieces of scantling are placed across the indigo weed to keep it down, and from rising as the water is pumped upon it out of the reservoir. This operation should be accomplished about sunset; and a steeper of this size usually takes about an acre of ordinary indigo weed to fill it. The time of steeping is usually from 9 to 10 hours, depending upon the temperature of the water. The warmer it is, the sooner the process is over. But when the water assumes a light olive color, it is time to draw the water into the beater, and the process of beating commences, which is continued until the fluid becomes lighter in its general shade, and blue fecula begins to show in the water; which the sooner begins from small quantities of lime-water having been let run by a spigot, from the lime-water cask, from time to time, during the process. After the fecula shows itself distinctly in the water, the vat is left to repose for four hours, when the water is slowly drawn off by holes at different heights

so as to allow the indigo to subside to the bottom. As soon as it has done so, it is carefully collected into bags, which are hung up to drain. When sufficiently drained, it is placed in boxes two feet by one foot, to dry under gentle pressure. When sufficiently firm, it is divided into squares, by a rule and some sharp instrument, and placed under the shade to dry—commonly in the upper story of a house. The varieties of indigo were produced by the time in steeping, in beating, in liming. The shorter steeping and less beating produced the flotent, or light blue indigo. But in looking back upon this process, I am astonished at remembering the indifferent and often turbid water that was used in steeping the indigo, which must have injured its quality.

In the dyeing houses of England a filtering apparatus is made, by four boards nailed together, 20 feet long and a foot square, which is filled with coarse sand or fine gravel, with the ends stopped by two other boards with very small holes in them, and the water used is drawn through this wooden filter, from the reservoir out of doors to the vat within the house, which purifies the water. This could easily be done here. Again, the frequent rain showers that occur in our common summers must have often disturbed both the process of steeping and beating, and thus injured the indigo. From all these causes, the warm process first introduced by Dr. Anderson, of Madras, and described by him in the Annual Register of Calcutta, and given in a note appended to Bryan Edwards's History of the West Indies, must be altogether preferable. This process is under cover, and it is only steeped two hours, the water being heated to 160 degrees. A house 30 by 20 feet would contain two steepers 10 feet square, and two beaters 5 feet by 10, the heating apparatus being placed between them, and would, as I think, take off twice the quantity of indigo in a day, besides continuing the process after, by the usual one, when the nights had become too cold.

In Georgia the indigo gave two cuttings, and usually 60 pounds of indigo, in the two, to the acre, which for three acres is 180 pounds to the hand. With the warm water process, I see no reason to doubt we would have three cuttings, better quality of indigo, and probably more of it; and this Dr. Anderson stated is the case.

My indigo-house has been built now two years, and I have only been prevented by the untoward seasons of the two years past from carrying out his plan.

The following is addressed to yourself and Mr. Partridge, whose communications upon this and other subjects I greatly value. Why not throw steam into your steeper for 10 or 15 minutes, and then pump the water from your tank? What is a little curious, steam allowed to pass off at the boiling point just heats to 160 degrees, the very point which Dr. Anderson found the proper temperature for extracting, or, as I would say, taking off the coloring matter from the weed. Again, we find, in all applications of steam, it acts more promptly and more perfectly than water, as witness the Turkish bath. By this process much labor would be saved in heating the water. We would have also an exact measure of heat, and experience would soon give the due measure of time. Nothing but my age and infirmities, combined with two bad seasons, have prevented my carrying out the experiment; but I would be gratified at having Mr. Partridge's opinion upon the subject.

THOMAS SPALDING.

Sapelo Island, *Georgia.*

APPENDIX No. 22.

SPURRY.

[Extracted and translated from the Journal des Connaissances Usuelles et Pratiques for 1841, by E. Goodrich Smith, of the Patent Office.]

ON THE GIGANTIC SPURRY.—BY M. BOSSIN.

The *spergula maxima* (D. Rechenbach) is an annual, and indigenous to Courland and Livonia, and grows there spontaneously; its stalks are about 1 metre to 1 metre 40 centimetres high, while those of ordinary spurry do not exceed 60 centimetres, and those of the small from 15 to 20 centimetres. At the height of one foot it shoots forth 5, 6, and sometimes 10 stems; its growth is as rapid as that of the common spurry, and we can easily obtain two harvests in a year. Like the latter, it furnishes, when green, an excellent fodder, which is peculiarly adapted to milch kine, the milk of which it increases at the same time that it improves the quality. This fodder is equally acceptable to sheep and swine, with which it agrees excellently. When in the first harvest, it is left to seed, the seeds which disperse themselves are sufficient, after one ploughing, to procure a very good autumnal pasture, which lasts till December, or even sometimes later. It is one of the first of the green fodders which is gathered, and which is enjoyed the longest period. The culture of this plant, when not left to bear seed, improves the soil, or at least does not exhaust it. Its seed, like that of flax, must be renewed from time to time, so as not to deteriorate.

The gigantic spurry best succeeds, in my opinion, on sandy soils; but it grows vigorously on the poorest soils, as also on good ones, provided they are not too strong. I have observed that it succeeds best when sown in April, when the soil is well dried, mellow, and carefully harrowed before sowing.

It is an excellent preparatory crop for rye, as it can be cut, then ploughed and manured, in season; or, better still, sow spurry a second time, which may be cut green time enough for sowing rye by Michaelmas day. I have not manured for spurry myself, but it succeeds best when a slight manure is given to the soil. It must not be cut too soon, because the gigantic spurry grows with vigor during its flowering season. It is very useful to destroy the parasite herbs, as it grows very rapidly, and these plants do not begin to flower before the *spergula maxima* is ready to cut. For my sowing I have employed for a morgen (25 to 30 ares) from 4 to 5 kilogrammes of seed. I believe that in fertile lands 3 to 3½ kilogrammes would be sufficient.

It was in 1839 that M. Malpeyre, sen., and myself, obtained the seed. We cultivated it by comparison with the common spurry sown in July, beside it, at the same period. The gigantic spurry reached to the height of about 1 metre, while the common spurry only reached that of from 15 to 25 centimetres. Experiments were tried again in 1840. Notwithstanding the great drought, I obtained in my fields of Limones (Seine and Oise) the most satisfactory results. Sown in April, the stalks, which I presented to the

Royal Societies of Agriculture and Horticulture of Paris, and other learned societies, were from 100 to 110 centimetres long.

M. Descolombiers, president of the Agricultural Society of the Allier, and of the agricultural committee of Bourbon l'Archambault, did me the honor to write me June 28, 1840, as follows:

"I have read, monsieur, with the greatest pleasure, in the *Propagateur du Cantal*, that you have the *spergula maxima*, which I have vainly attempted to procure anew, having lost it 15 years since. If you can give me a small parcel to sow by the first rains of August, I shall hope to obtain a crop of seed in this autumn, if the frost is delayed, and I shall be most grateful for the favor.

"I ask you also to allow me to republish in the journal of the Agricultural Society of Allier the article which you have addressed to M. Richard, editor of the *Propagateur du Cantal*, on that interesting plant, which yielded 600 kilogrammes of dry straw on a little more than 6 acres—straw which my cattle ate eagerly, and equal to the best hay."

I received the following letter from the same zealous and persevering agriculturist, dated the 18th of February, 1841:

"My spurry has reached the height of 60 to 65 centimetres, and given plenty of seed, though the weather has been very unfavorable; for the ordinary spurry, sown beside it by way of comparison, has only reached to 15 or 20 centimetres. M. the Marquis of Saint Georges, my brother-in-law, who, very little favorable to spurry, showed himself distrustful, having noticed the contrast, proposes also to sow the *spergula maxima* the next spring on a great scale."

I hope, then, that new trials will serve this year to sustain our experiments; and if, as I believe, the gigantic spurry may be easily cultivated in France, it will be for agriculture a great reliance; for, what we want in autumn especially is green fodder.

BOSSIN,

Nurseryman and seedsman, No. 5, Quai aux Fleurs.

APPENDIX No. 23.

LOCUST TIMBER.

For the Prairie Farmer.

PROFITS OF GROWING LOCUST TIMBER.

MESSRS. EDITORS: Similar calculations to the following were published in the Peoria Register, some years since, for the purpose of convincing some eastern landholders in this county that an investment of that kind would not be unprofitable, even for the timber on the land in cultivation, without reference to the advantages that would result from having a large quantity of prairie land surrounding it.

Cost of 40 acres prairie		$50 00
Cost of breaking, at $1 50 per acre		60 00
Cost of 5,000 rails to fence, at $25		125 00
Cost of putting up—say at $2		10 00
Interest on 40 acres, or $50 at 6 per cent.		3 00
Interest on breaking and fencing ($195)		11 70
End of first year		259 70
Hire of hand and horse, to plough	$50 00	
Cost of locust seed, say	2 00	
Interest on $259 70	15 58	
End of second year		67 58
Hire of hand, horse, &c.	$50 00	
Interest on $327 28	19 63	
End of third year		69 63
Interest on $396 91		23 81
		420 72
The fence may now be removed, and the rails are worth say $2 per 100		100 00
		320 72
Interest on $320 72		19 24
Amount now out of pocket		339 96
Every other row one way across the field may now be taken out, which will make 1,058 trees per acre; two round rails to each tree, or 2,116 rails per acre, worth $42 32; or, for 40 acres		$1,692 80
Making 84,640 rails, at 25 cents per 100		211 60
		1,481 20

Deduct all previous expenses	$339 96
End of fifth year, a clear profit of	1,141 24
Interest on same	68 47
End of sixth year, a clear profit of	1,209 71
Interest on same	72 58
	1,282 29
Every other row should now be taken out the other way, leaving the timber 9 feet apart, giving 529 trees per acre. The lower cut will make two rails and the upper cut one, which will be in all 1,587 rails per acre. These, at $2, give $31 74; or, for 40 acres	$1,269 60
Deduct the cost of making, 31 cents per 100	129 62
	1,139 98
Add the above	1,282 29
	2,422 27

The first thinning produced 84,640 rails, sufficient to fence 16 fields of 40 acres; the second, 63,480. Added together, they produce 148,120—sufficient to fence 29 fields of that size. Your field is then set in the best kind of timber, and at the proper distance. It will admit of thinning as it grows larger; and if the distance is too great when the trees are young, they will spread without running up.

The manner of planting, you have given in previous numbers of the Farmer.

It will be seen that the above calculation includes the cost of land and every expense, with annual interest on the amount, and still shows the above enormous profit. It may be said that paper calculations are never realized. Granted. But suppose half, a fourth, an eighth, or even none of the above $2,422 27 is made; is not the man the gainer who gets 40 acres of timber for nothing? This tract, with the timber at the distance of 9 feet, would have at least ten times the quantity that would be found upon any forty-acre tract in our country, and it would be of the best quality for farming purposes. It grows rapidly wherever it is planted, and can never be eradicated from the land.

TAZEWELL COUNTY, *August*, 1845.

APPENDIX No. 24.

DAIRY.

From the New England Farmer.

BUTTER-MAKING.

Mr. Breck—*Dear Sir:* I observed an article in a late number of your valuable paper describing the system of managing milk in Devonshire, England, viz: "Whether intended for the churn or otherwise, it is scalded immediately as it is strained from the cow; after this operation it does not sour so soon, even in summer; and, if it is intended for butter-making, you have sweet milk for family use after the cream is taken off. In winter, such cream will not require more than 15 minutes churning, to bring it into butter."

I have no doubt, sir, but the above system of management will produce all the results there stated. It will also cause the cream to rise more rapidly and in greater quantity. Even warming the pans into which the milk is put will produce the latter effect, but in a less degree. But, sir, is it equally true that such a system of managing milk would produce good butter? Will it not be paler and softer, and, from the greater quantity of caseine or curd which will be produced by such a system, will it not be more liable to become rancid, if kept for a length of time, than if the milk had not been scalded?

It is certainly very important to know the different modes of managing the dairy in different countries, and in different parts of the same country; for, in my opinion, there is no art in agriculture so shrouded in darkness as that of butter-making—if the butter generally found in the markets is a proper criterion to judge by.

But there are so many circumstances which affect the quality of butter, that it would not always be advisable to adopt the exact practice of another country, or of another district of your own country, nor even that pursued on another farm in your neighborhood. In different seasons, also, the same farm will produce a different quality of butter. The constitution of the cow, the condition she is in, the kind of treatment she receives, the breed she is of, the kinds of pasture and other food she eats, the length of time she is from calving, whether she is milked twice or three times a day, and whether the hands of the milker are clean and free from all taint—all these things affect the quality of butter. The quality of butter is also affected by the state of the milk at the time the cream is taken off, i. e. whether it is sweet or sour; also by the degree of sourness of the cream or milk at the time of churning. It is also affected by the regularity of the stroke in churning; for if the stroke be quick and irregular, the butter will be paler and softer, and not so rich as if the churning had been done more slowly and regularly. Churning after the butter is separated from the milk or cream, though it may add a little to the weight, has a bad effect on the color and texture of butter.

Much also depends on the temperature of the milk or cream at the commencement and during the whole process of churning; much upon whether the buttermilk is properly expressed, and the kind and quantity

of salt used, and whether it is properly mixed with the butter—that is, thoroughly and equally. Much also depends on the degree of sweetness in which the dairy utensils are kept. I do not mean *cleanliness alone*, for they can be clean without being sweet, although they cannot be sweet without being clean. The state of the atmosphere, and the purity or impurity of the air with which the milk and cream come in contact, also affect the quality of butter. The quality is also affected by the portion of milk or cream from which it is extracted; whether from the *last* portion of milk drawn from the cow, and whether from cream that has risen in the first six, eight, or ten hours, or from that of a longer period.

The above is the substance of several of the most important circumstances that affect the quality of butter. To go into detail would extend this to too great a length. I shall therefore only further add, that all these, and some other things, have to be taken into consideration by the successful dairy woman; so that much more depends upon her ability to form a correct judgment of the method best adapted for her own dairy, than upon her adopting strictly the system of any other person or place.

Much has been said and written against touching butter with the hand while preparing it for use, as the heat of the hand injures the butter, &c. Now, sir, I do not pretend to be sage enough to enter into the philosophy of this controverted point, but I will state what I know, viz: I know that it is the general practice in Ayrshire (a county in Scotland much famed for the good quality of its butter and cheese) to clap the butter with the hand in order to express the buttermilk, and to mix the salt thoroughly through it with the hand; to take it out of the churn with the hand, and to pack it into pots or firkins with the hand. And, notwithstanding this handling, I doubt not the butter generally made in Ayrshire would find a ready sale in Boston market. I also know that the best butter I have eaten in this country was made after the Ayrshire manner, and in the months of June and July of the present year; and the whole process, from taking it out of the churn until it was packed into the pots for winter use, was done with the bare hand.

I have seen different plans of working butter besides the hand; such as wooden clappers, wooden pressers of different shapes and powers, and also cloths for absorbing the buttermilk; yet I consider the bare hand to be superior to the whole, especially if the butter is to be kept for winter use, because the use of the hand is the most certain way of getting out all of the buttermilk.

Many people, who disapprove of working butter with the hands, are in favor of washing it with water; but, in my opinion, it will be more injured by the latter than by the former treatment.

There can be no doubt but the hand is naturally warmer than either wood or cloth, and when it becomes too warm the butter will adhere to it; but there is a preventive of this warmth, viz: to plunge the hands in warm water before you begin to clap the butter, and, while the operation is going on, have some cold water at hand to dip the hands into; and if they still become too warm, then wash them again with warm water, and repeat the washing and cooling as often as required. But my remarks have extended to a greater length than I intended at the outset, and I shall now conclude by subscribing myself

Yours, very respectfully,
ALEX'R BICKETT.

LOWELL, *November* 29, 1843.

From the American Agriculturist.

MAKING BUTTER.

I am glad you express the opinion, in the leading article of your August number, that "good housewives are never tired of reading upon subjects of *this* kind," for I have just prepared a short paper on the best way of *working* butter, which, if you think proper to insert, I should not like my fair friends to think one too much.

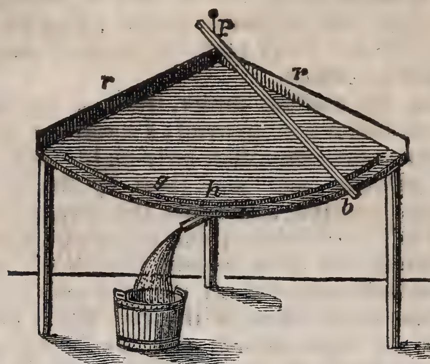
In giving directions for making butter, there is one omitted, without which all the others are literally of no avail; I mean the care of the cream. The milk should never stand more than forty-eight hours, for, if properly treated, all the oily particles will have risen by that time. When the milk is skimmed every morning and night, the cream in the crock must be thoroughly stirred with a wooden spoon before and after each addition. If this is neglected, there will be a deposite around the sides, which will contract and impart a stale taste that all the after care can never remove; and this is, I believe, the secret cause of the bad flavor of half the butter by which our markets are disgraced—fit only for the tables of those West India people, who, it is said, prefer butter that has some taste, some smell.

The directions given in the article above alluded to are, I think, very good. The London method I do not like. I would use no saltpetre; no pickle; neither annato, nor carrot juice, as color is of little importance if the flavor be good; and boiling water gives an oily taste, and so do the hands, which should never touch the butter. Working a second time, after the salt has lain in it for some hours, has a good effect, as it frees the butter from all watery particles, and gives it almost the consistence of wax. For working butter effectually, I know of nothing equal to a simple machine, which I will attempt to describe, and which any man who understands the use of tools can make in a few hours. It may not be new to you, but as I have seen no notice of or allusion to it in your former numbers, I venture to send it, accompanied by a rude drawing, to make my description more intelligible. It is much valued where it is known, for the complete manner in which it operates, and the amount of labor and time saved—a lad of twelve or fourteen years being able to work from forty to fifty pounds at once, in one-third the time required by the ordinary process. Some of the finest butter taken to the Baltimore and Philadelphia markets is made upon it.

The machine is a stout oak three-legged table, two feet eight inches high in front, by three feet behind. The top a segment of a circle of about two feet six inches diameter, with a rim *(r)* four inches high on the two straight sides; a groove *(g)* an inch or more deep, around the front, to catch the butter-milk, with a hole and spout *(h)* in the groove, to carry it into a pail beneath; a heavy bar *(b)* two inches thick, moving freely on a pivot *(p)* both horizontally and vertically.

The butter must be spread upon the table, and pressed firmly with the bar, moving from side to side, and back again; then turned with the paddle, and the pressure repeated until all the butter-milk and water have run off, after which it can be printed for market, or packed in kegs for exportation. If it is to be sent to a hot climate, it ought to be closely packed in stone jars, of not more than twelve pounds each, covered with a linen rag, upon which put a layer of salt, at the least an inch thick; cork the jars, cover closely with coarse cotton or linen cloth, and pack the jars

in kegs, an inch or more larger every way than the jars, with pulverized charcoal rammed between and over the top. I have known this done, and when unpacked in Liberia the butter was perfectly good, and hard enough to be spread with a knife—at least so said those who ate of it.



A butter-worker.

No dairy-maid in our part of the country need be told that this table must never be used for any other than the specified purpose. She would be almost as much affronted as if you told her to *wash* her milk-pail or *strain* the milk. This reminds me of Miss Edgeworth's account of the Irish method of making butter, which I will condense for the amusement of those little girls who have not had the good fortune to read her delightful story of Harry and Lucy.

She tells of a visit the children made to a dairy, where the maid put three gallons of cream into a churn, and, after churning for three quarters of an hour, produced *nearly* three pounds of butter. This was pressed to get the milk out, and then often washed in fresh waters, after which it was laid upon a flat dish, and cut into small pieces with a wooden slice, in order to have the cow's hairs picked out, which had fallen into the milk. Many of these hairs stuck to the edge of the slice, and the rest she picked out with her fingers! * * * * * * *

This "picking out" is an improvement upon the method said to be practised in one of the western States, from whence the story is told of a traveller who requested his hostess to send the butter and the hairs to his table upon separate plates, as he preferred mixing them for himself.

E. S.

Eutawah.

From the Albany Cultivator.

THE DAIRY.—BUTTER MAKING.

Smithfield, R. I., *December* 23, 1845.

I enclose an extract from a report on butter, made to the Rhode Island Society for the Encouragement of Domestic Industry. If you think it worth inserting in your valuable paper, let it appear as early as possible.

The rock-salt must go up this winter, to avoid the heavy canal tolls; and the small white-oak kegs must be contracted for soon. Half the winter's butter used in Rhode Island comes from the State of New York; and its price is diminished from four to six cents a pound by the use of Salina salt. This is a heavy tax on the farmer.

Butter made agreeably to the following directions sells in the Providence market readily, in large 100 lb. kegs, at 25 cents per lb. If in the small kegs of from 25 to 50 lbs., it brings from 25 to 27 cents. The same butter salted with New York salt would only be worth from 19 to 22 cents per lb.; and by the first of April it would be bitter and rancid. Your salt is not preservative: it will not answer for beef, pork, or fish. Why should it be used for so delicate an article as butter? Its bitter taste, and its easy solution in damp air, are no objections to its use for cheese.

STEPHEN H. SMITH.

Luther Tucker, Esq.

BUTTER MAKING.

Milk apartments, &c.—The milk-cellar should be deep, well ventilated, and dry; the bottom covered with stone flagging. Well rammed clay is preferable to bricks, as they will absorb milk and other liquids that may fall upon them; they cannot be cleansed, and will soon contract mildew—the smell of which, like the odor of cheese, vegetables, fish, or foul air of any kind, will be imparted to the cream and butter. Over this cellar should stand the dairy-room, with shelves to set milk upon in *cool* weather; the cellar to be used during the extremes of heat and cold. The temperature of the milk apartment, if possible, should never be above 65 degrees, nor below 45 degrees. Set-kettles should not stand in the dairy-room; neither should churning, cheese-making, or cleansing milk vessels be done there, but in a convenient room near by.

Cream may be kept good much longer if it be kept in a white-oak vessel, with a tight cover, and a faucet or tap near the bottom to draw off the milk when it settles, before the customary daily stirring. The quality of the butter is much improved by this management. If the milk be not drawn off, and it be churned with the cream, the butter will be longer in coming, and it will show specks of sour curd, taste like cheese, and will soon become rancid. Butter will come quickly at all seasons of the year, if the cream be of a temperature of from 60 to 75 degrees; to this end, use hot water in winter and ice in summer, but never add either to the cream in or out of the churn.

Salt.—Pure salt crystallizes into perfect cubes. All other forms of crystallization found in common salt arise from impurities; those of a needle shape in Liverpool bag, or blown salt, indicate the presence of lime, magnesia, &c. Epsom and Glauber's salts are frequently found in small quantities; in the process of making salt they crystallize last. When water is added, or on exposure to damp air, they dissolve first; hence washing salt purifies it. One great cause of the failure in making good butter may be traced to the use of impure salt.

Rock salt and the large lumps of Turk's Island salt, washed, dried, and finely pulverized, are preferable to all other kinds, being highly preservative, and hardening the butter, so that it will be sooner ready to work over

in warm weather. The Liverpool bag or blown salt, the Salina salt in small bags, from New York, and the fine part of every kind of imported salt, contain a great portion of impurity: they are not preservative, do not harden the butter, and give it a bitter taste.

Less than one ounce of pure salt is sufficient for a pound of butter—many put in half an ounce. In all cases leave out sugar and saltpetre.

In the manufacture of cheese, a preference is sometimes given to Liverpool bag or blown salt. This salt contains salts of lime and magnesia, which attract moisture from the air, and have the desirable effect of softening the cheese; and the pungent, bitter taste which they impart to it, is an improvement in the estimation of some.

General remarks.—The cream should not rise more than 36 hours: it should be sweet when taken off, and sweet when churned; yet there is a degree of maturity to be acquired by keeping. The kegs for packing butter should be made of white-oak, bilging in the form of casks, for the more perfect exclusion of air and convenience of transportation. If the butter is not to be sent to a warm climate, or a foreign market, let the *bilging* kegs have moveable covers, to accommodate inspection; they should be soaked in a strong brine, made also of *pure salt*, in order that justice may be done to the purchaser in tare, and to save the butter from being spoiled to the depth of one or two inches all round, from its contact with dry wood. In case the wood is any thing but white-oak, there is danger of its giving an unpleasant taste to the whole. For the convenience of families, the size should vary from 25 to 50 pounds. A large keg of butter is exposed to the air for a long time while on broach in a small family; the bottom, in consequence, becomes rancid.

The consumer will cheerfully pay an extra price for 100 pounds of butter packed in four kegs instead of one. No salt should be put on the sides, bottom, or between the layers. If the kegs are made with covers, put a cloth over the top, and cover that with pure fine salt. Keep a cloth wet with strong brine over the butter while the keg is filling, to exclude the air. The practice of washing butter is not approved of in Europe; it destroys its fragrance and sweetness by dissolving the sugar of milk, which, it is said, is always present in good butter. It is practised in Holland when the article is designed for exportation to India; then the operation is performed with cold, strong, limpid brine, made of pure salt and pure water. Water that has lime in it will not answer, as the lime is readily absorbed by the butter.

To exclude the air more effectually during the process of putting down, let a little melted sweet butter be run into the cavity where the bottom head and staves come together; then, after each layer is completed, let the dairy-woman pass her finger round so as to press the butter hard and close against the side.

From the Albany Cultivator.

CONNECTICUT CHEESE DAIRIES.

In our late excursion through Connecticut, we were glad to find satisfactory evidence that the character of that State for the manufacture of good cheese is still maintained. The two principal cheese neighborhoods which we visited were Goshen and Winchester. The first of these towns

became famous for its cheese at an earlier period than any other section of the country; but, though the place still holds a prominent rank in this respect, we are inclined to think, from what we saw and heard, that, for *general* reputation, "the sceptre has departed from" Goshen, and is now held by Winchester.

From Mr. A. Miles, of Goshen, a large dealer in cheese, we obtained some facts in regard to the quantity annually made there. The average quantity exported from the town is about 500,000 pounds. The quantity of butter sold is small, being only about 40,000 lbs. per year. Cheese has fallen much in price within a few years, owing to the increased quantity thrown into market. It sells this season, while new, at five cents per pound at home, or within the town. The average quantity made per cow is not known, but may be estimated at 300 to 350 pounds. Some good dairies make much more. Mr. Lawton sold last year an average of 403 pounds per cow; and, with what he kept for his own use, probably made 425 pounds per cow.

Mr. Lewis M. Norton, of Goshen, was the first manufacturer of what is called *pine-apple* cheese, in America. He commenced making this article in 1808. He had at that time no knowledge of the mode in which it received its peculiar form and qualities. He saw some which came from England, and set himself to work to imitate it. His first trial succeeded so well that he was encouraged to persevere, and he has so perfected the whole process, from the "running up" of the curd to the sale of the cheese, as to entirely distance all competiton.

Mr. Norton is this year using the curd from ninety cows for making pine-apple cheese. The principal portion of this curd is bought of his neighbors, for which he pays them the same price per pound that common new-milch cheese brings, which is five cents this season; so that those who sell him their curd save all the labor of pressing and curing their cheese, besides gaining considerable from the greater weight of the curd.

The curd is kept for twenty-four hours before it is made into cheese. The advantage of this is supposed by Mr. Norton to be, that a degree of fermentation takes place, which being checked at a critical time, by the cutting of the curd, preparatory to its being formed into cheese, is not renewed after it comes from the press; thus preventing the defect of the cheese being hoven or blown.

The curd is rapidly cut into pieces of not more than a fourth of an inch square, with a machine invented by Albert Loomis, Torringford, Connecticut, which Mr. N. prefers to any curd-cutter he has seen. After being cut, the curd is put in a cheese cloth, placed in warm water, and the temperature gradually raised by pouring in water that is still warmer, till it reaches 105 degrees by the thermometer. This does not *scald* the curd, which, according to the practice of the best cheese-makers in England and in this country, is, we think, discountenanced. The curd is next cooled, by adding cold water, to the temperature of 88 degrees, when the whole of the water is drawn from the vat, and the curd weighed, and salted with the finest kind of table salt, (four ounces of salt to ten pounds of curd;) and, after being well stirred, is put in the press, where it remains twenty-four hours, or a longer time, as is convenient, as it takes no hurt by remaining forty-eight hours. The curd is weighed immediately over the tub, being drawn up by a pully; and when this is done, is again lowered into the tub, where it is salted.

The cheeses are pressed in moulds, made of sound blocks of oak timber,

about twenty inches long and ten inches square. They are sawed lengthwise through the middle, and each half is carved or worked so as to give the general shape of a pine-apple—one half in each part. From the cavity to the upper end of the block, a groove is cut in each part, which, when the parts are placed together, makes a round channel of about two and a half inches in diameter, for passing the curd into the mould. When the two parts of the block are put together, in such a manner that the cavities match each other, and are strongly keyed into a frame, they form the mould for pressing the curd. The pressure is applied by means of a screw, operating on an upright, round piece of wood, which fits the channel in the block, and, as it is forced down, compresses the curd in the mould. The presses are very compact and strong, and appear to answer the purpose well. He had sixty-eight of them, and makes twenty-eight cheeses per day, weighing, when dried, five pounds each. When the cheeses are taken from the press, they are trimmed, then placed in nets and hung in water of the temperature of 130 degrees. This is to soften the outside, that it may receive the desired impression from the net, which is done by taking them from the water while enveloped in the nets, placing them in a frame and straining the nets tightly over them by means of screws. This indents the threads of the net into the cheese in such a manner as to give them the external appearance of the fruit from which they are named. After this operation the cheeses are hung up in the nets from three to five weeks, for the outside to harden, and are then set on shelves having suitable hollows or concavities for the cheeses to rest on. In the centre of each concavity a hole two inches in diameter is cut through the shelf, the more freely to admit the air, and allow any liquid that may come from it to run off. The nets used for the cheese are made of three-threaded flax-twine, and the manufacture of them costs, exclusive of the material, about five cents each. They will last three or four years.

Mr. Norton sells his cheese in New York, Baltimore, and other southern cities. It usually nets him about ten cents per pound, after deducting commissions. How much greater are the actual profits derived from this kind of cheese than are obtained from other kinds, we cannot tell. Mr. Norton has evidently incurred great expense in his fixtures, and in the time and study he has spent in bringing the manufacture of the article to such complete perfection ; and this ought, in justice, to secure him some corresponding advantages. He, however, makes no secret of any discoveries or improvements which his protracted and indefatigable labors have effected; but, with a highly commendable liberality, freely permits the most minute examination of his systematic operations.

CHESHIRE CHEESE.

The last Journal of the English Agricultural Society contains a prize essay, by Mr. White, of Warrington, on making cheese in Cheshire. As we have not room in our pages for the whole article, we condense and extract from it.

Time when cheese was first made in Cheshire.—The fame of the cheeses of Cheshire is of very ancient date—at least as old as the reign of Henry I, (A. D. 1100.) The Countess Constance, of Chester, though the

wife of Hugh Lupus, the king's first cousin, kept a herd of kine, and made good cheeses, three of which she presented to the Archbishop of Canterbury. Giraldus Cambrensis bears honorable testimony to the excellence of the Cheshire cheeses of the day.

Quantity made in the county.—There cannot be less, upon a moderate calculation, than 12,000 tons made in that county annually; a considerable portion of which is of excellent quality.

Art of cheese-making.—The art of cheese-making consists in the complete extraction of the whey, and in the proper compacting and curing of the curd. The richness of the cheese depends upon the quality of the milk, or, in other words, on the proportion of cream which the milk contains. The cheese of Cheshire is professedly made from new milk, or milk from which no cream has been taken. It is, however, well known that in many dairies, in the morning, before cheese-making, a small quantity of cream is skimmed off the previous evening's milk; this cream is either churned by itself, or mixed with whey-cream, by which there is obtained a better quality and greater quantity of (so called) whey-butter. It may appear singular to some that any portion of cream should be found in whey; but such is the fact, and the means used in Cheshire for extracting it are very simple.

Making of butter from whey-cream.—This varies very little from the process of making butter from the cream of milk. The cream is kept for three or four days, or until it has become clotted, (provincially termed *calved.*) Those who make the best whey-butter have a spigot and faucet to each of their cream mugs to let off the whey, which in the course of a few hours settles at the bottom, and which, if allowed to remain, imparts a rank flavor to the cream, and consequently to the butter. The temperature of the cream, when put into the churn, is generally ascertained by the hand; but if a thermometer be used, the heat which I would recommend is 60°, having found that the best. If it be much *higher* than this, the butter may be expected not only to be soft, but inferior both in quantity and quality; and if much *lower*, the operation of churning will be prolonged, and indeed tedious. At this heat the time in churning will probably be about an hour and a half. It will perhaps be necessary in cold weather to put hot water into the churn, and in warm weather to put in cold water, in order to attain this desirable object as to heat. From 100 gallons of milk there will not be less than 90 gallons of whey, which should yield from 10 to 12 gallons of cream, or $3\frac{1}{2}$ to 4 pounds of butter. The quantity of whey-butter per cow is about half a pound per week, taking the season through; but with that small portion of cream of the evening's milk added, the farmer often churns as much as three quarters of a pound of butter per cow per week, or from 20 to 25 pounds per annum. One pound of salt is sufficient for curing 37 pounds of butter, if for present use.

Number of cows kept, and produce.—The number of cows kept for the purpose of a cheese dairy is seldom less than 8 or 10, or more than 70 or 80, and is of course regulated by the size of the farm: these average about 90 or 100 statute acres, upon each of which about 15 or 18 cows are kept. From 18 cows, a cheese of from 36 pounds to 54 pounds weight is made daily during four or five months of the summer. The annual produce of cheese per cow depends both upon the quality of the animal (with the mode of keeping her) and of the *land*, or rather the *herbage.* I have known many farmers sustain great loss by not feeding their cattle

sufficiently well in winter. With judicious management, about 3 cwt. of cheese (of 112 pounds) may be considered as the average amount made per annum upon land let for 30*s.* a statute acre; but in a few instances 5 cwt. per cow, and even more, is sometimes made. This can only be from a small and choice stock.

Milking.—This operation commences about five o'clock in the morning, and five or six in the evening. In this county it is the practice for most of the servants, both men and maids, to assist, and for the cows to be milked in the cowhouses (called here "skippons") all the year round. When, as is usual, there is one milker for six or seven cows, the milking seldom exceeds an hour and a quarter. The milk of new-calved cows is not mixed with the other until about four or five days after calving.

Offices and utensils.—As the evening's milk is seldom made into cheese until the following morning, and sometimes in small dairies (where four "meals" are used) not until the second morning, a cool "milk-house" is necessary; on which account it usually occupies that side of the farm-house least exposed to the sun. The utensils in which the milk is kept are usually portable shallow earthenware vessels, called "pan-mugs," and in some dairies leaden or zinc coolers. Most of the milk-rooms have lattice or wire windows for the circulation of air, and the floors are laid in a sloping form for the free escape of the cold water with which they are daily swilled throughout the summer months. If precautions of this nature be not attended to, there is a risk of the evening's milk becoming *sour;* in which case, whatever quantity of new milk be added to it in the morning, the cheese will be *sour* also. I am led to believe that a temperature of as near 50° Fahrenheit as could be maintained, would be the best for a milk-house throughout the year. The *dairy* is generally situate near the milk-house, and fitted up with two *set-pans* or *boilers*—a large one for scalding the whey, and a smaller one for heating water. The "cheese-presses" and "screw" are kept within this room, and the operation of cheese-making is here carried on.

Lever pressing.—Poles, weights, and screws are now superseded by a new lever press. The advantages of this over the screw are, *that it sinks, by its own action, with the curd—any degree of pressure required can be applied and gradually increased, and less attention is necessary;* whereas the pressure from the screw is sudden and uncertain, and, having no self-action, requires the dairy-maid's assistance every five or ten minutes to render it effectual.

Quantity of salt required, and temperature of the milk.—A farmer in South Cheshire, well known for his introduction of improvements in agriculture, has commenced the system of weighing his curd previous to salting it, and he says he uses salt in the proportion of 1 pound to 42 pounds of curd. He also informs me he sets his milk together by a thermometer, and at a temperature of 76° or 77°.

Quantity of cheese milk will give.—It has generally been considered that a gallon of milk (supposing little or no cream has been taken from it) will produce, upon an average of the season, 1 pound of saleable cheese; that is, when the cheese is four or five months old. In autumn there is always more curd from the same quantity of milk than at any other part of the season.

The curd-mill.—This is of recent introduction, and it is only in a few dairies that it is met with; some dairy-maids highly approving, others ob-

jecting to it. I think it will soon be more generally adopted, as it effects a saving in time, and breaks the curd more regularly than it can be done by hand.

A recipe for curing the maw-skins (*stomach*).—Procure the skins from the butcher the year previous to their being wanted; clean out the chylous matter, and every other apparent impurity; the inside is then turned outward on a table, and salted; the skins are then laid one upon another, with a layer of salt between each, in a deep earthenware vessel similar to a cream mug; they are then covered over with salt, and have a lid of slate or flag placed on the top. They are taken out as wanted, about a month previous to being used, and the brine drained from them. They are then spread on a table, and fine salt is powdered on each side. In this state they are rolled with a paste roller, distended with a splint of wood, and hung up to dry.

Mode of making rennet from maw-skins.—The *rennet*, or *steep*, as it is commonly called, is next added. I have already stated, in the introduction, that this is an infusion made from the preserved stomach or maw of sucking calves, thence called *maw-skins*, or *bag-skins*. To define the quantity of rennet sufficient for coagulating a given quantity of milk is a very difficult matter, as the maw-skins vary so much in quality. When the farmer is laying in a stock for the year, he generally calculates upon a dozen of skins to a ton of cheese, but the skins vary in size; (the price when cured is from 6*s*. to 9*s*. per dozen). In using them, it is the practice often to cut two skins at once. Three square inches taken from the *bottom* (or strongest part) of one, and one or two inches from the top (or weakest part) of the other, is generally found sufficient for sixty gallons of milk. These two pieces of skin are put into a cup containing about half a pint of lukewarm water, with the addition of a tea-spoonful of salt, some part of the day previous to being used. The water thus impregnated with the maw-skin is passed through a sieve into the milk; but the skin itself is generally, though not always, kept out. The rennet cup is well *scalded* before being used again. I have been told that some farmers make a sufficiently large quantity of rennet to last for several weeks, and find it to answer better than making a small quantity daily. The question is, will it keep *sweet?*

From the Albany Cultivator.

MANUFACTURE OF CHEESE.

The following is an extract from the statement of Alonzo L. Fish, of Herkimer county, who received the first premium of the New York State Agricultural Society for the best cheese dairy, in 1844.

Calves' rennets *only* are used, after being dried one year. There are less animal properties in them than in new rennets, and will not make cheese swell in warm weather; and, on shrinking, leave them (like honey comb) full of holes, with a rank flavor.

Calves whose rennets are designed for cheese-making are not allowed to suck sick cows, or those giving bad milk, but are fed a plenty of good milk from five to ten days old; twelve or fifteen hours after sucking, when the gastric juices are most abundant and pure, the rennet is taken

out and stretched on a bow; as much fine salt is added as will adhere without draining, and hung in good air to dry. Milking is done in tin pails, and strained through a large tin strainer into a tin vat, where it is not skimmed nor moved till the cheese is made. The pails are set into a common sap bucket, which being light, and smaller at bottom than top, a little press on the pail will fasten the bucket to it so that it carries with the pail without any inconvenience. A light tap on the bucket will drop it, and leave the pail clean and not bruised. A tin vat, large enough to hold the milk, is set within a *larger wooden vat*, with one inch space between the sides and bottoms of the two to admit water, which is cooled by ice and heated by steam; which water cools the milk, to take out the animal heat, warms it to receive rennet, remains and heats whey, and scalds curd. It is discharged by a cock, to pass off into a tub, and scalds bran or meal for slop feed when it is required. Scalded feed is required daily when the cows are milked on hay feed. A large reservoir is built of stone and cement, to contain fifty hogshead of rain-water from buildings, to discharge by a cock into the above described space, into a steam generator, or into a tub, or any other place in the lower rooms where it is desired. A pump affords water to this apparatus in case of drought. Thus the same water is made to perform three distinct offices, by no more labor than to turn three cocks with the thumb and finger.

After the water in the reservoir is not wanted for cheese-making, a pipe conducts it into the top of ice-house, to freeze in solid mass in winter, for cooling milk the next season. No skimmer, pail, or dipper is required about this apparatus, only to milk in, as the cream which rises over night is not separated, nor no dipping of milk, whey, or water. The heating is done daily by a handful of chips or four quarts of charcoal, and all shift of apparatus can be made with one hand, while the other is employed in the milk or curd. A young man is hired at $11 per month, for eight months, to take the whole charge of nursing, feeding, making, and taking care of milk and cheese through the summer, and does no other business. He is required to keep a register, daily, of the variation (if any) of heat, salt, quality and effect of rennet, number of cows milked, quantity of milk from which cheese is made, condition of curd when put to press; when cheese is put on shelf, that it is weighed and numbered upon the bandage, so that, when cured, the result of certain variations may be known. An inch-pipe passes from the steam generator, and discharges steam into water under the tin vat; in ten minutes the whole mass is warmed to ninety degrees, to receive rennet. The cheese is then turned off (which would otherwise be lost) into a tub, which stands high enough to discharge into the cheese vat and scald it after the cheese is made. Hot water is drawn at any time from the same to cleanse pails, cloth hoops, &c. Calves' rennets only are used, after being one year dry, they being less apt to make cheese swell in warm weather, and of better flavor. A piece of rennet, to bring curd in forty minutes, is pounded fine in an iron mortar, and soaked a short time in warm water, mixed with a little annatto, drained, strained, and put into the milk. When come, the curd is cut in large pieces with a wood knife, thickest in the middle, to give it a slight pressure before there is much surface exposed to be rinsed by whey; after standing ten minutes, the pieces are cut smaller with the same knife, then broken up by putting the hands to the bottom of the tub, bringing them through to the top, with fingers spread, with a slow motion, to give it all a slight pressure without tearing fine, while tender.

Heat is kept as high as eighty-eight degrees while working, steam let on; the motion and pressure with hands increased with increase of heat and toughness of curd; heat is kept up to continue the action of the rennet, as it is most active when warm; heat raised to ninety-eight degrees; the steam is then turned off; it is kept at that heat thirty minutes. The heating is now done; the water and whey are discharged. One pound of fine salt to fifty of curd is added, while warm, to shrink the curd and prevent holes in the cheese. After getting cool, it is put to press; the pressure is from five to seven tons. In six hours it is turned into clean cloth; and again, in twelve hours more, is taken out of the press and put upon the shelf, weighed, bandaged, greased with oil or whey butter—turned daily. No greater heat is ever used in the operation than the natural heat of milk, (ninety-eight degrees.)

From the Albany Cultivator.

PRODUCTS OF THE DAIRY.

We intimated, in closing our remarks upon this subject last month, that we should make some suggestions as to "the means which should be adopted to secure the greatest increase in quantity and improvement in quality of dairy products." Before attempting this, however, let us first see what is the quantity now actually made in most of our dairies. Upon this point we have very little positive information, and must rely mainly on the opinions of dealers and persons who are well acquainted with the dairy business. Our intercourse with farmers and dairymen has enabled us to judge perhaps with some degree of correctness, especially as we have hundreds of times asked the question, "How much butter or cheese do your cows average in the season?" To this question we have received various answers; some putting the amount as high as 200 pounds, others at 150 pounds, and many nearly or quite as low as 100 pounds, of butter. We suppose that two and a half pounds of cheese are about equivalent to one of butter, so that the range in the average of cheese dairies would be from 250 to 500 pounds. Our own conviction, strengthened by the opinion of a number of dealers in dairy products with whom we have consulted, is, that the average production of butter cannot exceed 125 pounds per cow. The average product of cheese cannot much exceed 300 pounds. It is not asserted that these are the actual average products, but the amount here assumed will be found, on a careful inquiry, very nearly correct. The extremes, as before stated, are far above and below this amount.

For the purpose of showing what may be done with good cows and good management, we now propose to give a few statements which have come under our notice, or been communicated to us by persons engaged in this business, and, to give our readers an opportunity of judging correctly in the premises, we shall accompany the statements, as far as practicable, with an account of the measures pursued to arrive at the results spoken of.

We will first give some extracts from the report of the committee on cheese dairies to the New York State Agricultural Society, February 13th, 1845. From that report we learn that Mr. Abraham Hall, of Floyd, Oneida county, has made the past season, from forty cows, 23,427 pounds of cheese, and 200 pounds of butter. This is an average of five hundred and eighty-

five and five-eighths pounds of cheese per cow; and if we add the butter, we have equivalent to 598 pounds of cheese per cow. To accomplish this, Mr. H. informs us that he has 100 acres of pasture, (in addition to the cows, four horses and three dry cows are kept,) of good quality, though not very abundant, and about fifty-two acres of meadow. Cows are supposed to consume about two and one-fourth tons of hay each, as they are fed in stormy weather in summer, as well as a full supply in winter. Has not fed sixty bushels of grain to cows. The whey was all fed to twenty of the oldest cows, and Mr. Hall has no doubt that the twenty cows to which the whey was fed have made full 700 pounds each. Cows come in from the first of April to the first of May. They have access to salt at all times, which is considered important. The cows are well selected, regularly milked, and attended to in every respect. The cheese is made with great care and attention, and brings the highest price in market, having been sent to Philadelphia for several years past; but the last year a considerable portion of it was shipped to England. There will hardly be spare room in this article to give the details of the process of manufacture. We hope to hear more from this dairy next year.

From the same report to the State Society, we learn that Mr. Alonzo L. Fish, of Litchfield, Herkimer county, has made during the last season, previous to the 17th of September, an average of 592 pounds per cow; and Mr. F. estimates the quantity for the season at 700 pounds. The average the last three years, from twenty-five cows, has been 590 pounds. Mr. Fish also feeds the whey to his cows, and about the first of August commences feeding cornstalks (raised broadcast) once a day, to keep up a full flow of milk. While giving milk in winter, the cows are fed four quarts of shorts, or one peck of roots, per day. The dairy furniture and fixtures, buildings, &c., are convenient, and all well attended to. Here is an annual product of $41 40 from each cow for three years in succession—a handsome product truly in these times of low prices. Mr. Fish received the first premium from the State society for the best managed cheese dairy.

Mr. Elisha Baker, of Bridgewater, Oneida county, made in 1843, between April 15th and December 1st, 10,000 pounds of cheese and 1,000 pounds of butter, making an average of 500 pounds of cheese and 50 pounds of butter from each cow. In addition to hay and grass, the cows were fed two quarts of oatmeal per day, mixed with the whey from the dairy. The cheese was sold at five cents, and the butter at fourteen cents; making thirty-two dollars per cow.

We have thus glanced at some of the *large stories* from cheese makers, which are sometimes doubted, and often pronounced false by those who have no idea that any one else can make more than they have done, and are unwilling themselves to make even an effort to go beyond the old mark. These cases might be multiplied to almost any extent, had we room. Suffice it, however, to say, that there cannot be the slightest doubt of the correctness of the foregoing statements, and that the amount stated was actually made.

Let us now glance for a moment at the causes which have produced these results—results so different from those in common dairies. In the first place, we find a good selection of cows, every one of which is capable of making as much as the best in many of our dairies. Where is the dairyman who has not in his yard cows which will make nearly twice as much as others kept in the same manner, and treated in precisely the same way

in all respects? This has been our experience, and we have no doubt that it is so almost everywhere. Now, if we select, for our full number, cows of this character, the product will be at once greatly increased, without any additional allowance of feed. But where are these cows to be had? All farmers cannot have the best, it is true, but nearly all may have better animals than they do, by proper selection, if purchased, or by more care in breeding if raised by themselves. The truth is, very little attention has been given to the breeding of dairy cows, and too many dairymen depend on keeping their number good by purchases from *droves*, which are picked up in sections where little attention is given to dairying, and driven into the dairy districts to sell. Many of these are good animals, and many of our dairymen are good judges of cows, but we often hear them complain of the difficulty of purchasing good cows. We must raise more heifers expressly for the dairy, with direct reference to their milking qualities. But we have been led from the legitimate train of our remarks, to glance at the subject of breeding dairy stock, which we have not time to pursue.

Cows, to produce large quantities of milk, must have warm, well ventilated stables, and a full supply of suitable food. So important is the first point considered, that very few farmers now allow their cows to remain in the yard in cold weather; and when they are secured in good stables at the first approach of uncomfortable weather, and kept warm and well fed until they get a full bite of grass in spring, they will hardly fail to remunerate their owners for the extra expense. There can, however, be no extra expense in point of fact, for cattle kept warm will consume far less than when exposed to the inclemencies of the weather in this severe climate. In the cases of Mr. Hall and Mr. Fish, above referred to, very little grain or roots was fed, the principal addition to the usual food being the whey, instead of feeding it to hogs, as is usually practised. These gentlemen, with many others with whom we have conversed, are of opinion that as many pounds of cheese may be made from feeding the whey, as of pork, while the value of the former is usually greater than that of the latter. Mr. Baker fed about two cents' worth of oatmeal, besides the whey. For this he doubtless was well paid.

The greatest secret, however, in managing cows, consists not so much in the amount of food given, as in the regularity with which it is given, and the care and attention bestowed upon them at all seasons of the year. They should of course be fed liberally in winter, and more especially in the fall and spring, and have during summer an abundance of suitable pasture, and plenty of pure water and salt. They should be milked regularly and quickly, by the same person, every day, if possible, and treated with *gentleness* and *civility*, (an important feature in dairy management, which many persons have not yet learned,) so as not to worry and disturb them, either in driving or in milking.

We have given the product of several cheese dairies in which a little extra feed was allowed, and for the purpose of showing that large products may be obtained without extra feed. We now propose to give the product of a few butter dairies within our acquaintance, assuring our readers that we are acquainted with the individuals, on whose statements we depend, and that there cannot be the slightest doubt about their correctness. We do not intend here to give extravagant accounts, but such as will show what may be done by good care and moderate feed.

Mr. Porter, of Western, Oneida county, has a dairy of twelve cows and

three heifers—one of them three years old, and two of them two years old. From this dairy he has made, the last season, 2,600 pounds of butter for market, besides supplying a family of seven to nine persons during the year. This, it will be seen, is 173⅓ pounds; and if we add the amount consumed in the family, the quantity can fall very little if any short of 200 pounds. Mr. P. says: "We winter our cows on hay principally. After they come in, in spring, we allow them three quarts of oatmeal each per day, until they are turned out to grass. In my opinion the whole secret about making a large quantity of butter is, to keep the cows well through the winter; keep them in warm stables, and feed a little grain in spring. They must of course have an abundant supply of pasture, and an eye must be had to the management of the milk and butter." This may be set down as a good yield.

Mr. Timothy Wilcox, of New Hartford, informed us, early in November last, that he had made, up to that time, from five cows, 1,135 pounds of butter. Mr. Wilcox expected to make up the amount to 1,200 pounds before the close of the season. Besides this, milk was used in the family when wanted. One of these cows was two years old, one three years old, another four, and the others older. *Nothing but hay and grass was fed during the year.* One remark made by Mr. W. struck us as important. It was this: "I have milked these cows every time myself." Here, in our judgment, lies a part of the secret. (We hope that when Mr. W. sees this, he will go at once to the post office and subscribe for an agricultural paper.)

Mr. Brainerd, of Western, has made from sixteen cows, previous to the 15th of November, 2,720 pounds for market, besides supplying a considerable family. Here we have 175 pounds from each cow. This dairy was also kept on hay and grass alone, (except about 150 pumpkins in the fall,) but they were well fed and well attended to.

It is unnecessary to multiply instances; but we will say, in addition, that our friend Lewis Eames, of Lee, has uniformly made from 160 to 180 pounds for market annually. The dealers in butter all agree that where such large quantities are made, the quality is uniformly good; better than when small quantities are made. Good attention to one branch secures, in a great degree, success in the other.

The remarks made in regard to selection of cows, and their management for cheese dairies, apply equally well here; and we can only say that to equal, and even excel, the individuals we have named, farmers have only to procure good cows, give them good feed, both summer and winter, see that they are at all times protected from cold and stormy weather, have plenty of pure water and free access to salt, are regularly milked by careful hands, and, finally, that the milk and the cheese or butter, as the case may be, are properly managed. These constitute the essentials in dairy management—essentials which may be attained in almost every particular by all dairymen. It is easy to see, that while, in the usual method of managing cows, very little profit can be realized, the results arrived at by the individuals named (and there are scores of similar cases) cannot fail to afford a very handsome profit from their labor. It costs scarcely any more to keep a stock of cows in good order throughout the year than to let them get poor, and then, by extra feed, raise them again to good condition. Now, we hold that three-fourths of the dairymen in this country may, by simply having warm and well ventilated stables, feeding and milking regularly, and treating their cows gently, increase their products considerably, without one

dollar of additional expense; and if a few bushels of grain or roots be added in the winter and spring, the *profit* will be greatly increased. Of the method of managing the milk and manufacture of butter and cheese, we have not room to speak in this article, but will endeavor to speak of some points connected with that subject hereafter. The cases to which we have alluded are not extremes, but are frequent in many parts of the State; yet not one in a hundred reaches the amount named in these statements.

The season for commencing dairy operations will soon arrive—indeed, the time for giving increased attention to dairy cows is now at hand; and we appeal to all, so far to consult their own interest, if they have no mercy for their animals, as to look well to the care of their stock during the coming spring. We also respectfully suggest to our agricultural brethren the propriety of endeavoring to increase the products of their dairy, as well as of all crops and productions of the farm, the coming season. We *can* improve in these as well as other branches of agriculture. Shall we not say that we *will* improve in these things? Let us not be disheartened by the assertion, so often thrust in our faces, that we now raise more than we need of agricultural products. Or if this is really so, let us keep fewer cows, and make from them the same quantity which we now make from a greater number. And so with our crops. Let our motto be, "The greatest amount of produce at the least expense." Profit is our object; and how shall we secure it, except by cheapening the cost of production?

E. COMSTOCK.

From the New England Farmer.

REPORTS OF ESSEX AGRICULTURAL SOCIETY.

To the Committee on Cows and Heifers:

GENTLEMEN: The cow which I offer for exhibition and premium is six years old. She calved the 21st of May, and has given milk as follows:

From May 21st to June 21st	1,469	pounds	4	ounces.
June 21st to July 21st	1,264	"		
July 21st to Aug. 21st	1,127	"	8	"
Aug. 21st to Sept. 21st	956	"	8	"
Total	4,817	"	4	"

We sell most of her milk; but in order to ascertain its quality, we have made butter from it, and find that it takes nineteen pounds of milk to one pound of butter.

Her keeping has been good grass feed, with the exception of seven weeks, when she had two quarts of shorts per day.

The said cow was raised by John Bartlett, of Marblehead, and has been owned by me two years and six months.

HENRY CREESY.

SALEM, *September* 24, 1845.

To the Committee on Cows and Heifers:

Gentlemen: I offer for your inspection my cow Flora, of native breed, six years old. The said cow calved on the 21st of last April. The calf was kept to her until the 13th of May. With what milk the calf left, and all after taking the calf from her, until the 20th of May, we made 20 lbs. 8 oz. of butter.

Beginning at the 20th of May, we kept an account of the milk, by weight, morning and night, for the four months following, which was 4,375 lbs. Butter from said milk, 211 lbs. 2 oz. From the 20th of May to the last day of June, inclusive, 84 lbs. 2 oz. In July, 52 lbs. In August, 43 lbs. Twenty days in September, 32 lbs. 2 oz.

From the 20th of May to the last day of June, she gave 1,597 lbs. of milk; in July, 1,115 lbs.; in August, 987 lbs.; twenty days in September, 676 lbs.

Average of milk through the four months, per day, $35\frac{105}{122}$ lbs. Average of butter through the season, four months, $20\frac{155}{211}$ lbs.

Manner of keeping said cow: After she calved, I commenced giving her two quarts of meal per day, until the last day of May; the 20th of May I put her to pasture by herself. Her pasture was good through June. The first week in July it failed; so I took her out and put her in an old pasture with other cows for three weeks, to let my pasture grow. I then put her back again in my pasture, and kept her until the 24th day of August, when I put her, with another cow, in new feed. I commenced giving her, the 30th of August, one quart of Indian meal and one quart of rye meal every night. She had no meal, roots, or any thing, only what the pasture afforded, from the first day of June until the thirtieth day of August.

WARREN AVERILL.

Ipswich, *September* 23, 1845.

ON BUTTER.

The Society's first premium for June butter was awarded to George W. Dodge, of Wenham.

Process of making.—The milk is strained into tin pans, where it stands from 36 to 48 hours. It is then skimmed, and the cream put into tin pails, standing on the bottom of the cellar. A little salt is put into the pails before putting in the cream, which, at the times of addition, is stirred. We churn twice a week. The buttermilk is thoroughly worked out by hand—no water being used for that purpose. In warm weather, the cream is lowered into the well the night before churning. Immediately after the buttermilk is worked out, the butter is salted with an ounce of ground rock salt to the pound, and in about 24 hours it is again worked over.

From the Albany Cultivator.

QUALITY OF MILK, &c.

One good cow, full fed, is worth more for the dairy than four ordinary half-starved ones. As an illustration of the truth of the above fact, we quote the following from an English publication: "A farmer some years since

kept *eighteen* cows upon a *common*, and was often obliged to buy butter for his family. The common was *enclosed*, which deprived the farmer of his pasture, and the same person supplied his family amply with the milk and butter from *four* cows *well kept*."

An ordinary cow, fed on young clover, should give, for the first three months after calving, from fifteen to eighteen quarts of milk per day, which will produce, if of good quality, $1\frac{1}{4}$ lb. of butter, or nearly 9 lbs. per week. Where the number of cows is greater, the average will be less; because, where there are only one or two cows, a deficiency in one of them is immediately noticed: the cow is got rid of, and a better one substituted.

The excellency of a dairy cow is estimated by the quantity and quality of her milk; and the quality of the milk is estimated by the quantity of butter that it will yield. Much depends on the quality of the food, but more on the animal. The writer has known one cow whose milk would not produce butter, and was never discovered while milked with the herd, but was soon apparent when separated and milked alone.

There is a simple instrument, called the lactometer, used for measuring the relative qualities of cream which the milk of different cows, at the different seasons of the year, affords. It consists of a mahogany stand, supporting six glass tubes of equal length and diameter. These tubes are marked ten inches from the bottom, and graduated down in tenths of an inch for three inches. Now, the milk from the different cows is poured into each tube, (which should be marked with the name of the cow,) and filled to the upper or ten-inch line, and the number of degrees the thickness of the cream occupies in each tube indicates the per centage. For example: if the bottom of the cream stands at one inch, it denotes 10 per cent. cream.

In a trial, with one of these instruments, of seven cows, six weeks after calving, in the months of March and April, we found they varied from 13 to $7\frac{1}{2}$ per cent. Out of the seven cows, the milk of two produced, after standing twenty-four hours in a temperature of 48 degrees, thirteen per cent. cream, one twelve, and another eleven per cent., in the same temperature; another, at 46 degrees, 9 per cent.; while two, at 40 degrees, stood at $8\frac{1}{2}$ and $7\frac{1}{2}$ per cent. The milk of four cows mixed, in a temperature of 48 degrees, marked 11 per cent. Now, it is well known, by those who have paid any attention to the subject, that temperature has considerable influence in raising cream, which may, in part, account for the low per centage of the two last-named cows; but in other trials we have found they varied from 7 to 20 per cent.

After comparing the accounts, given in a variety of places and situations, of the average quantity of milk which a cow gives when kept alone, and well fed, as they generally are, with a full supply of food, such as they relish, to the extent of their appetites, the result is, that it greatly exceeds that of our best dairy herds, and the quantity of butter made from a given quantity of milk is also greater.

I am aware that high feeding of milch cows on grain is not generally believed to be profitable; but I am satisfied that the cows would give milk nearly the whole year, be made good beef at the same time, and their calves would be much more valuable.

If cows are ever allowed to fall away low during winter, in vain shall we hope to obtain an abundant supply of milk by bringing them into high condition in the summer; for, if a cow be lean at the time of calving, no management afterwards will ever bring her to yield, for the season, any thing

like the quantity of milk that she would have done had she been all the while in high condition.

C. N. BEMENT.

AMERICAN HOTEL, ALBANY, *August*, 1845.

For the Louisville Journal and Dollar Farmer.

DESCRIPTION OF THE LARGE DAIRY ESTABLISHMENTS THAT SUPPLY THE PRINCIPAL CITIES OF GREAT BRITAIN WITH MILK.

Having read of late, with much interest, (in the eastern agricultural papers,) an account of various well conducted farms, I am induced to think an abridged description of some of the great "lactarys," as they are fashionably called, of the old country, from notes taken several years since on a tour with the late Dr. Ratcliff, the excellent and efficient secretary to the "Farming Society of Ireland," will be received with some interest by your readers, and it possibly may be also instructive. My observation convinces me there is much in their management that could be well and profitably adopted by our dairymen in this country.

The two largest dairies in the world, containing the greatest number of cows giving milk at the same time in the same establishment, are in London, situated near and within sight of each other, at Islington, formerly a part of the suburbs, but now a well built and densely populated portion of that great city: the one established more than half a century ago by the late Mr. Rhodes, and still conducted by his sons; the other established about the same time by the late Mr. Laycock, and now in possession of his sons also.

Rhodes's, which I shall first describe, is the most complete of the two. The number of cows now kept there varies from seven hundred up to nine hundred. Mrs. Rhodes, who, after her husband's death, took the whole management of the concern for some years upon herself, told me that she several times attempted to have one thousand cows milked, but that the number was never completed in the morning; that, before night, death or some other accident occurred among them to prevent her accomplishing that desire. The ground on which the buildings are placed is a slope of some three or four acres, fronting the east. The sheds run with the slope for the drainage, and more easily wheeling off the manure, as well as for supplying water for the cows through small cast-iron troughs, which are fixed in the walls at the heads of the cows, in such a manner that one trough may be supplied from the other the whole length of the house. The sheds are twenty-four feet wide and ten feet high; tiled roof, with rising shutters for ventilation, and panes of glass glazed into cast-iron skeleton tiles for light. The floor has a slight fall to a gutter along the centre; a range of stalls, each seven and a half feet wide, for two cows to stand in, runs along the sides, to which they are fastened by chains and rings running on upright iron rods in each corner. A trough, formed of Welch slate, bedded in cement, its upper edge eighteen inches from the ground, is fixed at the head of each animal, to hold its food. The sheds are placed adjoining and parallel to each other, with openings in the walls opposite each cow, one foot wide and four feet high, in which is placed the iron trough to contain the drinking water, calculated to serve two cows in different

sheds, but opposite each other; which water is supplied from one large cistern by pipes. Each iron trough has a wooden cover, which is shut down during feeding time, to prevent the water being dirtied. At the upper end of the shed is the dairy, consisting of three rooms: the one a measuring room, where all the milk that is sold and goes out is first measured; the other a scalding room, with boiler and fireplace; and the third, a room where all the surplus milk is strained up and set away for cream and butter. At the lower end of the sheds are two yards, surrounded by sheds also; the one for fattening the cows off when they become dry, and the other for store and breeding pigs. The pigs consume the skim-milk remaining on hand, which is kept in a well, made of brick, laid in cement, twelve feet deep, and six and a half in diameter, in which it soon becomes sour, and then fed to the pigs, as it is well known to be more nourishing when given in that state than when sweet. The principal stock of pigs are breeding sows, as the sucking pigs sold for roasting are found to be much the most profitable. The dung is all emptied into a pit for that purpose, off a platform at the bottom of the yards. Within the last ten years there have been constructed in the rear of the sheds several large pits ten feet wide, twelve feet deep, and twenty feet long, made of brick, bedded in cement, into which are packed several months' supply of brewers' and distillers' grains, which form the chief food for the cows, and which can only be had during the winter months. The grains are firmly *tramped* into those pits, and each layer, of about one foot in thickness, is well salted; when filled, the top is covered over with boards, and on those is put a thickness of earth, compactly beaten down, sufficient to perfectly exclude the air as well as the frost. Grains packed in this way have been opened in four or five years, and found to be fresh and good food, and as eagerly eaten by the cows as those that had just been carted in from the brewery. There are also on the premises a large stock yard, sheds, and pits for roots and straw, a large room for cutting hay and clover into chaff, cart-sheds, stables, a neat and spacious counting-house, with a large, well ventilated room overhead, containing several iron bedsteads, with hair mattress and pillow to each, where the regular work hands belonging to the establishment, who are single men, sleep.

The cows in this establishment are all bought, newly calved, in the cow market, held in Islington every Monday. They are kept as long as they continue to give *not less than two gallons of milk a day*, and are then fattened off for the butcher on oil-cake, grains, and cut clover hay. All breeds are to be found here to some extent, but the short-horns are preferred, and are greatly in the majority; they are generally found to be more abundant milkers. The shortness of their horns, too, admits of their being placed closer together; and another reason is, because this breed is more frequently brought to market than any other. The Ayrshire breed was tried to some extent, and highly approved of, as giving very rich cream, fattening in a very short time when they left off giving milk, and particularly for producing a quantity of beef which sold much higher than that of the short-horns; but the difficulty in procuring this breed was so great, that they abandoned the idea of keeping them. The length of time during which a cow, treated as in this establishment, continues to give milk, varies from six months up to two years, the large majority overgoing twelve months. The treatment in this establishment differs from that in most others. The cows are *never untied* during the whole time they remain in the house, having clean

fresh water to drink, constantly before them. They are kept very clean; the sheds are well ventilated by the openings in the roofs, which are certainly far preferable to the usual horizontal entrances for air, by holes through the side walls. The principal food of the cows, as in all other London dairies, consists of grains; that is, malt after it has been used by the brewer or the distiller. Distiller's wash, which is the remainder, after distillation, of a decoction of ground malt and oaten meal, is also given to the cows, but more frequently to those that are fattening than to such as are in milk. The average price of brewers' grains is about fourpence or eight cents per bushel; distillers' grains, on account of the meal which they contain, about double, or sixteen cents per bushel; the wash usually sells at sixpence, or twelve cents, for thirty-six gallons. Salt is given at the rate of two ounces to each cow daily in this establishment, mixed with the grains given before milking, at 3 o'clock in the morning, and about 2 o'clock in the afternoon. A portion of green food or roots is supplied alternately with the grains; and in winter, when tares or green grass cannot be procured, after the potatoes, turnips, or mangel-wurtzel have been eaten, a portion of hay is given.

The produce of Rhodes's dairy is entirely milk and cream for private families and for public hospitals. A number of public institutions are supplied directly from this dairy by contract. Private families are supplied by milk dealers, who have what is called milk-walks; that is, a certain number of customers whom they supply twice a day; they are thus enabled to ascertain the average of what their customers require, and they contract with Messrs. Rhodes for this average. The latter calculate the number of cows sufficient to give the dealer the supply wanted, and this number the dealer undertakes to milk twice a day—at 3 o'clock in the morning, and at 3 o'clock in the afternoon. The milk is measured to the dealer; and should he have milked more than his quantity, it remains with the dairy; but should the cows be deficient in quantity, it is made up from the milk of other cows milked on account of the contracts of the establishment. As the supply of the cows and the demand of the dealers are constantly varying, large quantities of milk remain on the dairyman's hands, frequently as high as seventy to eighty gallons, which is strained up in shallow earthen vessels for cream. The cream is churned, the butter sold, and the skim-milk, as well as the buttermilk, is put into the milk-well for the pigs.

The management of the whole is committed to three persons: a clerk, who keeps the books, collects the debts, and pays and receives all moneys; a man who superintends the feeding and treatment of the stock, and who has the general care of the premises; and a woman who measures the milk to the dealers, and superintends the dairy. The cows are all purchased and sold by a regular salesman.

Laycock's dairy is also at Islington, nearly on the opposite side of the way to Rhodes's, but stands on a greater number of acres. The number of cows kept in Laycock's is about the same as that kept by Rhodes, but in treatment they differ some little. I will notice only those particulars in which this establishment differs from Rhodes's. The cows are fed in the same way, with the exception of not getting any salt on their grains, but the hay is salted when put in the rick. They are turned out once a day to drink from troughs in the yards, remaining out from half an hour to three hours, according to the weather and season of the year. From the end of June till Michaelmas, the cows are turned into the fields from 6 o'clock

in the morning until 11, and from about 2 o'clock in the afternoon until about 3 the following morning. The remaining hours they are in the sheds, for the purpose of being milked. The cows in this establishment are, on an average, kept in use longer than in Mr. Rhodes's; those which become dry are fattened in the same way, with the addition of boiled flax-seed, which is found to be a valuable assistant. The mode of using it was to me quite novel, as was its use at all for the purpose of fattening. It is boiled in a common boiler, and, when reduced to a pulp, let out into large wooden cisterns by tubes, where it was mixed with clover chaff, roughly cut, and sometimes with grains; and, when cool, given to the cows, who eat it in this way with great avidity. In this establishment those cows which are good milkers are allowed to take the bull, for which purpose eight bulls were kept on the premises. The usual period of keeping the cows is from four to five years. The calves are sold in Smithfield cattle market, the market next after they are calved, to those who make it a business to take them to the country and fatten them for the butcher. There are three extensive farms belonging to this establishment but a few miles distant, at one or other of which the cows in calf are kept when dry. The hair of the tails is kept closely trimmed off, to prevent the risk of dirtying the milk, and their bodies are curried over once every day. The pigs, in addition to sour milk, get also ground linseed and grains.

In addition to this dairy establishment, Mr. Laycock has a series of enclosed yards, about half an acre each in size, with open sheds sufficient to shelter from eight thousand to nine thousand head of cattle, which are appropriated to taking in stock for the nights previous to the days on which Smithfield market is held, which are on Monday and Friday of every week in the year. For this purpose the situation is admirably adapted, lying on the great north road, and being within a short and straight drive of the market, which, singular enough, is situated in the very heart of the most thickly populated part of that immense city. Those layers and this dairy establishment may be considered as a central farm yard to the three hay-farms, which they amply supply with immense quantities of the finest manure for top dressings.

The whole is under the management of the two brothers, assisted by a clerk and a very active dairy-maid. The proprietors of those, the two most extensive milk establishments in the world, are near and intimate friends and neighbors from their birth, are on the best possible terms, and have as free recourse to either establishment as though they belonged to the same person. They frequently compare notes as to the management and expenses, and they both still rigidly adhere to their own particular management, each contending for his superiority, and offering to prove it by a reference to his books. All I can say is, that both are managed with great care and attention, systematized in every department. They have been carried on successfully and profitably for more than half a century by the fathers, and subsequently by their sons; and I have no doubt that, in a century from now, whoever lives to see it will find the same successful operation, and both under the management of the great grand-children or immediate descendants of the original founders.

The Metropolitan dairy is the next largest establishment of the kind in London; it is situated in the Edgeware road, (the northwestern suburb of the city,) and was founded some twenty-five years since by the late Mr. Rhodes. It was sold by him, some few years after, to one of the bubble compa-

nies of that day, from which its present name is derived. By them it was sold to Mr. Wilberforce, and is now his property. It stands on about one acre of ground, and is calculated to contain about four hundred cows. The cow houses are in parallel ranges, twenty-four feet wide, and side walls eight feet high. The space allowed here for each cow is three feet nine inches, and the greater number of the cow-houses are without stalls. As in Mr. Rhodes's establishment, the cows here are never untied, except to remove them to the fattening sheds, or to send them to the country to remain till calving time. A cow so treated seldom produces more than two calves, remaining, after each calf, an average of eighteen months in milk.

The cows are milked at 3 in the morning and 2 in the afternoon, and the milk disposed of to dealers as before described. The food is principally grains, which, instead of being kept in pits in the open air, as at Rhodes's, are preserved in the cellar of a large building about fourteen feet deep, and are covered, when packed down, to the depth of one foot with cow dung, to protect them from the influence of the air. Dry hay is seldom given in this establishment, the chaff of clover hay being always mixed with the grains or wash. The cows are never turned out to water, but, from a large cistern, pipes are conducted to every cow house, and at certain hours each day the water is turned into the manger, which is on a perfect level; and it runs slowly past each cow, so that she drinks at pleasure. When any cow gets sick, she is bled, and is purged by giving her one pound of *Epsom* salts, with two ounces of flour of sulphur, and an abundance of warm water. The mode of treatment seldom or never fails. Four bulls are kept for the cows; and, as they become dry, or nearly so, they are sent out to a grass farm till calving time. The quantity of salt given the cows in their food here does not exceed one ounce daily, on account, as they assert, of its drying quality; a complaint I never heard made but in this establishment, and with which I cannot concur. The manure of this establishment is disposed of in a singular and interesting manner: all the fluid part is discharged by sewers into a large brick cistern, laid in cement, and sold by the hogshead to the hay farmers in the neighborhood to manure their meadows with, which is done with the common watering cart used for the streets. The solid manure is compressed into small squares or cakes by an hydraulic press, and is all shipped to Norfolk and to Yorkshire; the computation is, that a two-horse cart load of dung is reduced to the size of a cubic foot by this means.

There are many minor dairy establishments in and about London, none of which are worthy of notice, save one at Little Acton, about five miles from Hyde Park corner, under the sole management of a maiden lady, (Mrs. Cook,) and stands on a farm of two hundred acres, the whole of which is devoted to meadow. There are two hundred and fifty cows in three sheds, standing head to head, with a passage of five feet between the troughs. The cows here are never untied except for about two months in the autumn, when they are let out after each milking for about two hours, to fill themselves off the after grass. Water is supplied to them in their troughs twice a day, through pipes from a fine spring adjacent. Grains, with roots and other green meat, are the principal food of the cows; and Mrs. Cook considers it much more economical to turn the entire of her farm to meadow, and with the extra produce to purchase the other food wanted for the cows, rather than multiply her expenses and increase her own trouble and cares, by placing it under a system of agricultural courses. There is

no doubt but Mrs. Cook's establishment, for its size, returns, under her peculiar management, a better profit than any other in London or its neighborhood. Her cows are all milked by her own men, at 2 o'clock every morning and 2 every afternoon, and the produce sent in six-gallon block tin cans, on a superior two-horse "C" spring carriage, (with scarcely any motion to it,) to a West-end milk dealer in Edward street, Portman square, who contracts for the whole. This establishment is characterized, beyond any other I have ever seen, by its great neatness and cleanliness, both as regards the premises, the cattle themselves, and all those who attend upon them.

It is worthy of remark, that in no instance is there to be found a milk wagon used for the delivery of the milk to the families; it is always carried in tin cans, suspended from a wooden yoke that fits over the shoulder, by either women or men, who generally distribute in this way from twenty to twenty-four gallons within two hours. It is considered—and with some truth, too—that jolting the milk in wagons has an injurious effect upon it; certainly tending to make it sour, and rendering it entirely unfit to set for cream. This mode of delivery causes the milk dealers to have a better understanding amongst themselves as to the distribution of their customers, the same person being generally found to serve with milk every house that takes any in the same street, and consequently rendering the labor much less.

This communication, which is already longer than I intended, warns me to reserve for my next a description of Booth's extensive feeding-house, attached to his gin-distillery, and of the Glasgow and Dublin dairies—both better managed than the London ones, I think—as well as a glance at some of the Dutch dairies, which are under still better management than either.

Wishing to contribute to the interest of your paper all in my power, I beg your acceptance of this communication, with the respect and good will of

A Farmer.

APPENDIX No. 25.

CATTLE, &c.

[From proceedings in the New York Farmers' Club.]

SOILING CATTLE.

Mr. Edward Clark—*Sir:* As to soiling, I understand it to apply to all green food that is raised for the purpose of feeding to stock in summer or winter—the stock being kept up and fed on the same. I consider the root crop as one of the only sure means in our latitude of carrying out the principle through the season; I therefore have been in the habit of raising roots for my stock for several years, and I do not think I could do well without them. I will therefore state, as nearly as I can, my mode of raising them, and feeding, &c. I will name them in the order in which I estimate them for feeding to stock. Carrots I consider the most valuable. I feed them to all kinds of stock, and consider them better for my horses than oats; and for my milch cows, in winter, they not only give the butter color, but flavor equal to summer-made butter. I raise them in drills, the rows about 20 inches apart, and the carrot in the row say from four to six inches; mangel-wurtzel in drills, two feet apart in the row, and one foot in the drill; sugar beet the same distance; ruta-baga two feet apart in the row, and about nine inches in the drill; and common turnips I sow broadcast as follows: say in June, I find some pieces in my lots intended for mowing, that the grass has winter-killed, or in some way is destroyed; these pieces I plough up, taking care to turn them over as well as I can, sometimes before and sometimes after mowing, but always in time to sow and re-seed with grass by the 20th July. I roll my land, and harrow it well the same way I plough it, and put on about 15 cords of manure to the acre, (barn-yard manure;) I harrow until all is well mixed; I then sow my turnips, say one-half pint of seed to the acre; it is my wish not to have the seed nearer than nine inches of each other; in doing so I give my grass seed a chance to take root. At the time of sowing my turnips, I sow a compost, prepared as follows: ashes, 15 bushels; bone-dust, five bushels; plaster, one bushel—per acre; in this way I always raise good turnips, and, I think, at a trifling expense, as all that was done was with a view to re-seed the land, &c. As to the other root crops, the same rule as to manuring will apply to them, but the ground must be made mellow to any depth you please—the deeper the better. I use the same compost, in the drills, for all my roots, taking care at all times to apply it in a moist condition. I raised the last season the white Silesian carrot, at the rate of 960 bushels to the acre; but I prefer the orange carrot. As to feeding roots, I feed them to my fat cattle, cows, horses, and hogs, in the raw state; nor do I think it advisable to cook them for any animal except the fatting hogs. I then boil them and mix provender, and feed when soured. Quantity per day: I feed to my cattle say three-fourths of a peck, to be fed at two different times, say morning and evening; my milch cows, one-half bushel per day; my store hogs, of beets say three pounds per hog, and one gill of corn per feed. By feeding in this way, I have always found my stock to

improve, and I never have had them to scour or be injured in any way from their feed on roots. I continue my feed on roots to my fat cattle until about the 1st of January; I then commence feeding on meal, made with corn and cob, and continue the roots, at discretion, in smaller quantities. I should not have thought it necessary to state the quantity I feed at a time, but for the reason that some gentleman at your meeting, above alluded to, condemned the root crops; all I can now say is, that this is not my experience, nor do I believe it will be their's, on a fair trial.

With respect, I remain yours,

WM. MAK'INSTER.

MIDDLETOWN, CT., *April* 4, 1845.

The Chairman.—A bushel of carrots, well cut up by a proper root cutter, is as good as a bushel of oats for a working-horse. I have tried the experiment fully and satisfactorily: I have fed twelve quarts of sliced carrots, instead of twelve quarts of oats, to a horse, the whole winter, and found no difference in the results. I gave hay with the carrots as we do with the oats. The carrots cost about ten cents a bushel, and the oats near thirty cents a bushel.

Dr. Underhill.—The general average price of oats is about thirty-five cents a bushel.

The Chairman.—Carrots are beneficial to horses that have the heaves. Others have practised as I have with like satisfactory results. I have raised three hundred and twenty-five bushels of carrots on three-eighths of one acre. I manured with decomposed peat and ashes. I sub-soiled the hill. The white carrot is good; gives rather greater yield than the orange carrot; it grows more out of ground, and is easier to gather. I do not attach much value to the ruta-baga; it has, however, one advantage—it may be sowed late, and upon any vacant spots in a field, and is so far clear gain.

From the Cultivator.

WINTER FOOD FOR DOMESTIC ANIMALS.

In most parts of the northern States, a very large portion of the year requires the feeding of dried or stored food to domestic animals. Usually one-half of the last month of autumn, the three winter months, and at least two of the spring months, must be passed without the aid of pasture, throughout the more northern regions of our country, amounting to almost half of the entire year. It hence becomes one of the most important of all questions in farming—what are the cheapest and best kinds of food for the subsistence of domestic animals through this long and costly period?

The article which stands at the head of the list, as being the most largely used as well as the most important every way, is meadow-hay. But auxiliaries are needed; not only because the hay crop is often greatly diminished by drought, but even when abundant, a mixture of other substances contributes to the health, comfort, and thrift of the animal. Greater cheapness, too, is attained by a portion of other kinds of food. An examination and comparison of these hence become a matter of considerable importance.

In addition to hay, may be mentioned (as among those substances which are either in common use, or should be) carrots, ruta-bagas, straw, beets, potatoes, and grain. The propriety of the use of these may be judged with tolerable correctness, by taking their respective nutritive values, together with their cost in raising, and comparing them thus with hay. In the following table we have taken a few of the more commonly cultivated roots, and deduced their nutritive value from the actual experiments of a considerable number of distinguished agriculturists, the mean or average of the results they arrived at being taken. The figures indicate the number of pounds of each needed, to be equal to 100 pounds of hay.

Carrots - - - - - - -	276
Ruta-bagas - - - - - -	300
Mangel-wurtzel - - - - - -	317
Potatoes - - - - - -	201
Common turnips - - - - -	494

It will be perceived that potatoes are the most nutritive, carrots next, then ruta-bagas and mangel-wurtzels are nearly equal, while common turnips are far behind the rest. Then as to the expense of raising. The same degree of fertility in soil will give about 250 bushels of potatoes, 500 of carrots, 600 of ruta bagas, and 700 of mangel-wurtzels. This is mere estimate, but is probably not far from the truth. The cost of seed and planting is greater for the potato than the other crops, but the after culture rather less; on the whole, the expense of raising an acre of each will be nearly equal. The cheapness of seed and ease of sowing are in favor of ruta-bagas, but on cloddy soils this advantage is more than balanced by danger from the turnip fly. It is understood, as a matter of course, that in these estimates the best culture is to be given—that is, all the roots but the potatoes are sown in drills, from two to two and a half feet apart—not more; that they are hoed as soon as they are up, or before two inches high, which not only greatly reduces the labor, but allows an early and vigorous growth; and that clean, well tilled, and fertile land is selected for them, and not rich waste land, loaded with the seeds of millions of weeds, which, without the cost of much labor, get the ascendency, and choke down the young crop.

Taking all these circumstances into account, it will be perceived that carrots, ruta bagas, and mangel-wurtzels stand nearly on equal grounds as to merit. But the far greater avidity with which horses will eat carrots, the excellent butter which results from their use when fed to cows, and the little injury they receive from frost, even when the crop or a part of it is left to winter in the ground where it grew, give this crop most eminently the preference.

Now for the cheapness of roots as compared with hay. A ton of hay, according to the experiments already mentioned, is equal to 5,500 pounds of carrots, which, at 60 pounds to the bushel, would be 91 bushels. One acre of carrots, then, or 500 bushels, would be equal to 5½ tons of hay. According to our own experience, such a crop may be easily raised and harvested for fifteen dollars, which would place the carrots as a cheaper food than hay, if the hay were only three dollars a ton. But the superiority of the condition of horses and cattle, when fed freely on carrots, with hay, is an additional advantage.

Straw.—The following shows the comparative nutritive properties of straw, by indicating the number of pounds needed, to be equal to 100 lbs.

of hay. But it must be observed that these results will vary greatly with the ripeness or freshness of the straw, and other circumstances connected with its growth or condition.

New wheat straw	272
Oat straw	166
Barley straw	176
Pea straw	169
Clover hay	94

But as the quantity of straw is wholly dependant on the quantity of grain raised, and is in fact only a secondary crop, the amount which each farmer possesses can only be controlled by economy in saving what he has, which cattle will eat freely if mixed with hay and chopped, or alone, unchopped, if well salted.

There is another item of cheap and nutritious food in the shape of cornstalks, sown for fodder. The value of common cornstalks, raised for the grain, depends greatly on the quality, and the amount which cattle can consume without refuse, depending on the size of the stalks, variety of corn, &c. But when the corn is sowed thickly for fodder alone, all is consumed, and a ton is probably fully equal to a ton of hay. Five tons *at least* (according to repeated trial of the writer) may be raised as follows, on an acre of respectable fertility—say rich enough for 500 bushels of ruta-bagas. Plough and harrow as usual; furrow one way two and a half feet apart, with one horse; strew three bushels of corn to the acre along these furrows, from a basket; cross-harrow to cover the corn; pass the cultivator two or three times along the rows, but not hoe them; and mow with scythes, dry, and draw in. The whole expense, including interest on land, need not be more than twelve dollars; placing the cornstalks, which are more palatable for cows than any hay, at less than two and a half dollars a ton. There is no exaggeration about this, but it is the result of repeated trial.

An objection is made to the extensive use of roots, on account of the difficulty of keeping them and feeding them out through winter. But this objection must disappear at once if a good *root cellar*, close at hand, is constructed. The farmer must have a barn for his hay, and he must have a cellar for his roots; the latter need cost no more than the former. The objection, therefore, should vanish.

Another objection is, that animals do not like roots—will not eat them or it is hard to teach them to eat. This difficulty may be variously obviated. Cattle scarcely ever refuse any kind of roots. Horses and sheep reject them at first; but perseverance, short allowance, or chopping up fine and mixing with meal, and then gradually returning to a coarser chopping, and a diminished quantity of meal, will usually do the work. We have taught old horses, which totally refused ruta bagas at first, to gnaw down whole ones with great avidity, and a neighbor regularly wintered his store hogs mainly upon them without cooking.

The comparison of different kinds of grain with hay, according to the before-mentioned experiments, is as follows:

Corn	52
Barley	53
Oats	67
Peas	47
Wheat	46

Eighteen bushels of corn will therefore be equal to one ton of hay. The farmer can judge, from prices, whether a loss or gain would result from a free or scant use of this grain. He can also apply the same rule to other kinds of grain.

On reviewing these estimates, it will be perceived that the greatest loss which farmers usually sustain is from the neglect of the free culture of root crops, and of cornstalks for fodder. An abundance of roots at hand would enable the farmer to save one-half of the hay usually fed to cattle, or one-quarter of the whole cost of feeding them. An equal saving would result from the use of cornstalk fodder. Taking, then, these two articles together, and not forgetting the increased amount of butter and milk, and the improved condition of the animals, it is probable that one-half the expense of wintering cattle would be saved by an improved system; and perhaps equal advantages would result in the keeping of sheep and horses. Making allowance for difficulties in introducing such a system in poor soils or unfavorable localities, and calling the gain only one-quarter, what would be the total gain in the State of New York alone? There are in the State, according to census, about 470,000 horses, 1,900,000 cattle, and 5,000,000 sheep; the total expense of wintering them cannot be less than twenty millions of dollars, at a low estimate: one-quarter of this would be *five millions*, saved every year in one State.

The saving which we have made ourselves, and which we have seen successfully practised by others, satisfies us that these estimates are very moderate, and that this conclusion arrived at is not speculation, but positive and existing fact. The great assistance which such a system would lend to fertile and compact culture, instead of skimming and surface work, by increasing manure and fertility, should induce every enlightened agriculturist to labor assiduously for its general extension.

APPENDIX No. 26.

SHEEP, WOOL, &c.

From the Am. Agriculturist.

SHEEP HUSBANDRY IN KENTUCKY.

I am highly gratified at the various indications I have observed in the American Agriculturist of a disposition favorable to an extension of sheep husbandry in the United States. This is a subject in which I have always taken a deep interest, because I believe it will not only greatly promote the agricultural interest, but tend, in an eminent degree, to advance the wealth and prosperity of the whole Union. The difficulty of finding an *adequate* market for our rapidly increasing agricultural products, renders it necessary that we should avail ourselves of as many new sources for the *profitable* employment of *land* and *labor* as possible. Nothing, in our present circumstances, is better calculated for this purpose, than sheep husbandry. We have *land* in great abundance, whilst *labor* is comparatively scarce. Sheep husbandry requires much land, and is attended with the advantage of requiring *comparatively* few laborers, and, instead of exhausting, tends greatly to fertilize the land thus appropriated. Sheep husbandry may be practised in almost every part of our extensive country; but doubtless some portions of it are better adapted to the business, and it can be carried on more economically than in others. Without pretending to speak disparagingly of other parts, allow me to set forth the claims of Kentucky as eminently adapted to this highly useful branch of agriculture. To illustrate its fitness for this purpose, suffer me to refer to my own practice in a small way.

For some years after I commenced raising sheep (my cleared land and pastures being then very limited) I *housed them* during the winter months, and fed them with hay, sheaf-oats, and occasionally with corn. But when my cleared land and pastures became more extensive, I found that I could winter my sheep to better advantage by suffering them to run on blue-grass pastures, kept in reserve for them, hauling out, and scattering on the turf, corn fodder, when the grass became too short or was covered with snow. This mode of feeding required less labor, and was less expensive than housing them; and experience soon taught me that my sheep passed through the winter in better condition than when housed and fed on hay and grain.

I have now about three hundred acres of cleared land, nearly one-half of which is in meadow, clover, and blue-grass, (*poa pratensis*,) and the other half reserved for cultivation in corn, wheat, hemp, &c.; and one hundred and fifty acres in woodland, the greater part well cleared up and sown in blue-grass. I have been taught by experience, recently, that sheep will do remarkably well on the rankest clover, which will enable me in future to keep more of my blue-grass pastures in reserve for winter feeding. During the last fall (the season being favorable) my clover fields furnished my flock, of somewhat less than four hundred, sufficient pasturage till the month of January; and they have been since kept on my blue grass pastures, without the necessity of feeding, except some four or five days, when

the ground was covered with snow; and there is still grass enough to carry them through the residue of the winter.

The low price of hemp, and agricultural products generally, has induced me to sow down much of my cleared land in clover, which will enable me to keep double the number of sheep I now have, without interfering with my farming operations; and when I get the whole of my woodland cleared up, and set in blue-grass, I expect to extend my flock to one thousand sheep. Thus you see we are neither under the necessity of incurring the expense of erecting buildings to shelter our sheep, nor of raising grain or hay for their food, nor even to employ laborers to feed them, except during the short time it may become necessary to haul out fodder for them when the ground is covered with snow. And in a single day enough may be hauled out on sleds to last them a week or more.

It is argued by some that our rich lands are too valuable to be appropriated advantageously to sheep husbandry. There would be much force in this objection if they were entirely appropriated to that purpose; but not so when sheep husbandry is combined with large hemp and corn crops. Hemp has hitherto been a profitable crop, though now it is too low to justify its extensive culture; and large corn crops are necessary with a view of raising horses, mules, cattle, and hogs. There is no system of husbandry so well calculated to prepare our lands for large products of corn and hemp as feeding sheep on our clover lands. I had supposed, till I made the experiment, that sheep would not do well on rank clover.* To satisfy myself on this point, I put about one hundred and fifty wethers on a clover field, when in flower, early in May. The clover was at the time nearly as high as the sheeps' backs, (Merinoes.) I kept them on this during the whole summer, and in the fall they were fat enough for the butcher. It is true, they trod down much of the clover; but as I had an abundance of pasture, this was an advantage, as it left a thick mat of grass on the ground, intermingled with the droppings of the sheep, distributed with much regularity. This thick covering prevented a loss of manure by washing rains, and rapidly brought on a second growth of clover, which furnished my whole flock with an abundance of pasture till the early part of January. The season was, however, unusually favorable, and hence the clover pastures lasted two or three weeks later than usual. In future, I intend to keep my sheep entirely on my clover fields from the time they are in flower, and thus I shall be able to keep in reserve a greater supply of blue-grass for winter feeding.

But it is not upon our high-priced rich lands alone that we can carry on sheep husbandry to advantage. Kentucky has a belt of hill and mountain country, bordering on the Virginia line on the east, and on the rich lands of the State on the west, averaging about seventy-five miles in width, extending from the Ohio river and Big Sandy, latitude 38° 30′, to the Tennessee line, 36° 30′ north. The whole of this region is admirably adapted to sheep husbandry; the most northern part but a few minutes north of my residence, and extending about two degrees farther south. The lands

* Feeding sheep on clover, especially when fattening them, is quite a common practice in Europe and in the northern States of America. They do extremely well upon it; and, if accustomed to it gradually, there is no fear of hoven, the only thing to dread from rank clover pasture. By good feeding, sheep may be pushed forward in their growth and breeding one year. They will, moreover, be larger and finer in the carcass, and produce a greater weight of wool, and that of a superior quality.

are very cheap—the State price of those not yet appropriated only five cents per acre, and those purchased second-hand, more or less improved, may be had from 25 to 50 cents per acre, and still less when unimproved. This country in a state of nature furnishes, during the spring, summer, and fall months, a fine range for sheep, and is susceptible of great improvement by clearing up and sowing the cultivated grasses for winter feeding. This whole country is finely adapted to the Spanish mode of sheep husbandry. Very large flocks might be driven to the mountain region, some thirty to sixty miles from the rich lands, immediately after shearing time, grazed till late in the fall, and then brought back to be sustained during the winter on the luxuriant blue-grass pastures of the rich lands of the interior.

A very intelligent friend, residing in the southern part of the above district of country, speaks of it in the following terms: "One of the strongest proofs of this region of country being favorable to the growing of sheep stock is, that we are situated in the same degree of north latitude with the sheep raising parts of Spain—Leon, Estremadura, Old Castile, &c.—only that our mountains are more richly and abundantly clad with luxuriant wild grasses and fern, pea vine, and shrubbery, than the mountain regions of Spain, where they raise such abundant stocks of sheep. Wayne county, with a few adjoining counties, affords more fine water-power than any country of the same extent that I have ever known; and for health, and fine, pure drinking-water, no country excels it on the face of the globe. Now is the time to commence the business of sheep husbandry, whilst land can be got almost for nothing. It is worthy of remark that our sheep, which are suffered to roam and graze in the mountains altogether, produce about *one-fourth more wool at a shearing than the sheep that are raised and grazed altogether on our farms, and of much better quality.*" In another part of his letter he says: "The tops of the mountains of Spain are sterile, without verdure, producing no food for sheep, or other animals, to graze on. Our mountains are quite different. They are thickly clad from bottom to top, and all over the top, with fine, rich wild grasses and shrubbery of every variety, for stock to graze on. In the midst of our mountains are to be found a great abundance of salt-water and stone-coal of the finest quality, together with a great variety of mineral waters and pure springs."

Another friend, residing in Knox county, writes to me: "My sheep upon my farm, adjoining Barboursville, do not thrive, even with pasture and winter food, like the sheep in the extremities of the county, which have neither pastures nor winter food, except what they get in the woods. Without cultivated grasses of any description, sheep will live and do well all the winter, subsisting on the spontaneous growth of the country."

Another friend, residing in the northern portion of the above-described mountain region, writes that "the counties of Carter and Lawrence, and the eastern portion of the State, are admirably adapted to sheep husbandry. There are several flocks of sheep in this neighborhood that thrive and increase wonderfully, *running at large*, at little cost or trouble to the owners. Many flocks have no other reliance, during the winter, but what they get in the woods. The great advantages of this country for sheep husbandry are, the cheapness of the land, its adaptation to grasses, grain, and roots—its heathfulness. Sheep delight in mountain or hilly land—the natural evergreens and shrubbery upon which sheep can feed and subsist on in winter; though it is not safe to rely altogether upon these."

I could give many other extracts from letters addressed to me by highly intelligent gentlemen, residing in the mountain districts above described, to show its admirable adaptation to sheep husbandry, but I refrain from doing so, for fear of running this communication to too great a length.

There is also a strip of low-priced land bordering on the Ohio river, in the counties of Bracken, Pendleton, Campbell, Kenton, and from thence to Louisville, finely adapted to sheep husbandry; but I have not space to go into a description of it.

A few remarks as to the probable future market for wool will conclude my letter—already, I fear, too long. The returns of the late census show that the number of sheep in the United States in 1840 was a fraction less than 20,000,000. Twice this number would probably not furnish more wool than would be needed by a population of 17,000,000, if we were to manufacture all our own blankets, carpets, and every other description of woolen fabrics. The period is not very distant when this will be done, with the exception of some very fine goods. We shall then need about 100,000,000 pounds of wool for a population of 17,000,000, and in that proportion for home consumption, even supposing none should be exported. Now, as our population increases (as past experience demonstrates) at a compound ratio of three per cent. per annum, we shall have a population of 34,000,000 in the year 1864; 51,000,000 in 1878; and 60,000,000 in 1888.* We shall need at these respective periods two, three, and four hundred millions of pounds of wool. If we estimate sheep, upon an average, to produce two pounds and a half of wool per head, we shall require, in the year 1888, (a little more than forty years hence,) 160,000,000 of sheep. This view of the subject, without looking to a foreign market, holds out a strong inducement to engage in sheep husbandry.

A. BEATTY.

From the Nashville Agriculturist.

SHEEP IN THE CUMBERLAND MOUNTAINS.

After having spent part of the years '43 and '44 on different parts of the Cumberland mountains—*the part of Tennessee more particularly recommended* by all writers in your journal, and others, for sheep walks—I have, since last fall, settled on a portion of them near Jasper, Marion county, and will, as briefly as possible, give you the result of my experience, which will, I believe, fully remove any erroneous impressions hitherto made.

First, as to climate. The extreme salubrity of the mountains makes them the general refuge of the sick. Sheep here are remarkably healthy, and exempt from disease. The temperature is very even, varying during summer seldom more than from 75° to 80° of Fahrenheit, nor in winter more than from 45° to 30°. Snow during the two winters, little as there was of it, never remained forty-eight hours on the ground.

The forest, so far from being dense, seldom contains more timber, after cutting out the smaller growth, as dogwood, &c., than is desirable for woodland pasture. The rocks, as far as my rambles have extended, are "few and

---

* See a table of population, by an annual increment of three per cent., in Niles's Register, January 11, 1845, page 300.

far between." The better spots of soil (and there are enough to provide every farm with sufficient remunerating arable land, under a provident and enlightened system of tillage) are covered with nutritious weeds, as pea-vine, &c., &c., which are nearly all greedily devoured by sheep and cattle, and on which they fare well. The poorer soil is covered with sedge-grass, which my sheep have invariably eaten with avidity.

When our herds and blue-grass lands, which we are laying down, will be fit for pasturing, the cost of wintering will be greatly reduced, as the former yields good grazing in February—the latter during the whole winter. Our young cattle kept in good condition on the winter range and two ears of corn per head per day.

Although the wolves of our mountains are larger than those of the prairies, and may be more difficult to exterminate entirely, yet, thanks to our good hunters, their ranks have been already so thinned that they mostly prowl about alone, or at most in pairs, committing their depredations by night, on the sheep and hogs that are left to shift for themselves. In the two years that I have been here, I know of but two instances of their having attacked young stray cattle by night. By day, sheep are perfectly safe; and I should presume that every good sheep-master would have his flocks, for inspection, home at night, when any common fence will be an ample safeguard for them.

C. F. KRAMER.

WOOLVERLY FARM, MARION CO., TENN, *June* 24.

MR. FLEISCHMANN'S ACCOUNT OF WOOL IN GERMANY.

VIENNA, *December* 1, 1845.

DEAR SIR: In a former letter I stated that I was present at the convention of German agriculturists which was held at Breslau in the beginning of September last. Being held at the capital of Prussian Silesia, a country famous for the production of the finest Merino wool, the subject of wool was rendered particularly interesting, on account of a large collection of fleeces and specimens of the best breed of Electoral rams and ewes being exhibited to the inspection of the members.

The wool-growers of the neighborhood of Breslau, and other places of Prussian and Austrian Silesia, Bohemia, Moravia, Hungaria, Russia, Mecklenburg, and Saxony, sent several fleeces of their finest animals, for the purpose of showing the progress the above-named countries are making in the improvement of their flocks. One of the largest halls of the university, where the meetings were held, was used for the exhibition of these fleeces. They were spread out upon tables provided with printed labels, which gave the age and sex of the animal, the weight of the fleece, the stock from which they sprung, with the name of the proprietor, and country where they were sent from, in order to facilitate, by comparison, the examination of those interested in this branch of husbandry.

These fleeces were the best which the above-named countries could produce; and it was a rich treat to the connoisseur of wool to see the state and progress of that branch of industry in so many countries. They all differed in degree of fineness, and more or less in the requisite character to

be pronounced perfect. Only two of them were considered as bearing all the signs of a perfect Electoral wool.

They were all of a high degree of fineness, but wanting in a "constant character," as the Silesian wool-growers call it, or in weight, in the length of the wool-hair, and in many of those demands which are made on a fleece of "constant and thorough character."

Those which were pronounced as answering all the qualities of Electoral wool came from Prussian Silesia. This province has gained the reputation of producing not only the finest wool, but to be the only market where thorough blood can be obtained, and to which wool-growers come from near and abroad to select and buy stock to improve their flocks. Saxony has lost its former fame, which arises from mismanagement, and from the increase of population, in consequence of which land becomes too valuable to be used for pasture.

The high degree of fineness to which wool has been brought by the most renowned wool-growers of Silesia, can only be fully appreciated when wool from the present period is compared with that of the years when the first Merinoes were introduced into Germany; which proves to Spain that it was not the climate, nor the rich and suitable pastures, but perseverance, and, above all, intelligence, which took from them the golden fleece.

Nature has done something for this province: its lands are high and dry; the pasture has been improved by its high cultivation; the climate is neither too cold nor too warm, so that a thick cover at any period of the year is inconvenient to the animal. The population of this portion of Germany is known for its superior degree of intelligence; which, when added to the common virtues of the Teutonic character, industry and perseverance, gives them the advantage over other countries.

Kuchelan, Hennersdorf, Gross Sterlitz, Chrzelitz, are the names of the places where the finest stock is raised, and to these places rush the wool-growers of other countries from great distances, at the beginning of every year, when the surplus stock is sold, to obtain a few heads of these famous breeds.

The prices for which some of these rams are sold seem enormous, and it will astonish some of our American farmers when they are told that a single ram is sold at from $1,500 to $2,000, and then the buyer considers it a favor to have obtained such a famous animal. The rich estate-holders of Russia, Hungary, &c., &c., seem to pride themselves on having it said that they obtained a certain famous ram for a great sum of money. It is here as it is everywhere, sometimes—more for the name than for the intrinsic value of the object; and a ram from another place, for one fourth of the price, would answer the purpose just as well.

The flocks of Prince Lichnowsky have the reputation of being the finest, and of most thorough blood; as, for forty years, he has never relinquished for a moment improving his flocks. He has in Prussian Silesia about 8,000 head, from which he sells every year the surplus number for the sum of 40,000 rix dollars; and it is he who obtains such high prices for single heads.

Experience has shown that only thorough blood should be employed in the improvement of stocks of all description, and the wool-grower is very desirous to obtain it from a flock of established character, where the wool has all those requisites which the manufacturer requires of Electoral wool. Sometimes inferior flocks produce animals having all the requisites desired;

but such an animal will produce lambs inferior to itself, and full of the faults of the parents. Such mistakes, which arise from want of knowledge or misapplied economy in the purchase of stock to breed from, will retard a flock for years, and produces faults which are deteriorating to the whole character of the wool.

The selection of stock to breed from requires a well-practised eye, to detect the injurious character of the wool upon the different parts of the sheep, and at the same time to select an animal which has the proper shape and strength to suit his flocks, the climate, and the local conditions.

Several attempts have been made in the United States to raise fine wool, which could bring prices equal to those of the Silesian market; but it never succeeded fully. The first importation of Merinoes from Saxony was at an early period, when Saxony flocks had no constant character in their wool—when a fine and faultless animal was scarcely to be got; and at that period the wool-growers of Saxony had, neither, the experience to give advice to others. Those imported from Spain were of as coarse a nature as those of Saxony, and the whole business of crossing was not conducted with sufficient care. The importations made of late are of a higher degreee of fineness; but, as it is generally a matter of speculation on the part of those to whom the well-meaning wool-growers intrust the business of selecting and buying, the selections are made from flocks of less thorough blood and imperfect character of wool, and the name of being Saxon or Silesian sheep must generally cover all the faults of the chosen stock.

Those who know the country, the language, and are good connoisseurs, are made the dupes of the cunning speculator. How easily, then, is it to deceive a stranger, from a foreign country, whose time is limited, and who has to trust to that which is told him.

Nature has destined that the United States shall be the granary of the world, and that its extensive tracts of mountainous land shall raise the necessary material for clothing for its vast territories. The high Alleghany will give to innumerable flocks of Merinoes an excellent pasture during the hot days of summer; and, when the snow covers the mountains, the spreading plains below the snowy summit will, nearly all the year round, yield sufficient pasture, especially in the more southern parts of the Union, where scarcely a handful of fodder will be required to be laid in for winter. The luxuriant heavy grass of the prairies will answer for the English long-wooled sheep, and for the hardy zackel of Hungary, which furnishes also the most delicious mutton.

I obtained, from the committee which was appointed for this branch, specimens from the different fleeces; and I flatter myself to be able to lay before you a collection of specimens rare and curious.

I prolonged my stay in this part of Germany to obtain wool from the animal before it was shorn and washed, and shall visit for that purpose, yet, the most celebrated establishments of that kind.

I made drawings of those rams and ewes which are considered as having the true character of Electoral breed, and hope to add some more such *sheepish* likenesses from the stock of the most celebrated flocks.

I made also a collection of sketches of agricultural implements of the different countries I traversed, which, I think, will interest you, not only for their originality, but as a proof how a nation clings to the agricultural implements as well as customs of their forefathers, whereby we are enabled to trace the different races, in the most distant ramifications, with

certainty; and sometimes, when no trace has been left of their original language, the plough tells us from where they come. The plough is also the scale by which we can judge of a nation in regard to its intellectuality and general state of social condition. We may fairly say, as is the plough so is the intellect, and so is their personal liberty.

The United States proves fully this position: *there* it is that we find the best improved plough; there is it, also, where the farmer stands the highest in point of intellect and personal freedom, over all others of the globe.

The farmer of the United States endeavors also to enrich himself with the knowledge of his noble profession. I hope the day is not far when they will take measures in order to accomplish this important object more fully; that they will instruct their representatives, in State legislatures, to establish regular agricultural schools, in which their sons, after having passed through the ordinary schools, may receive at that school that information which enables them to husband their lands with more advantage, according to the rules deduced from experience; whereby the country will be enriched, love to the land of their fathers increased, and the main pillar of the republic strengthened.

In my next I shall say a few words on agricultural schools. I visited, among others, that of Moegelin, near Berlin, (Prussia's first establishment of that description,) which was intrusted to the wise direction of Thaer, a name so well known to the agriculturist of all countries.

Your most obedient servant,

CH. L. FLEISCHMANN.

Hon. EDMUND BURKE,
Commissioner of Patents.

From Willmer & Smith's European Times of January 4, 1846.

LIVERPOOL ANNUAL WOOL REPORT.

The favorable views we expressed in our last annual circular of the prospects of the wool trade were fully realized during the first six months of 1845. An extent of consumption, probably without precedent in the same period of time, was accompanied by an unusual steadiness of price, and freedom from any appearance of speculation or over-trading; and yet there has seldom been a period, with the elements of the trade so sound and promising, that has resulted in so little profit to those engaged, whether importer, stapler, or manufacturer. This we principally attribute to the relatively high price of the raw material.

The early months of the year were marked by unusual activity. The protracted winter gave an extension to the home trade, whilst the continental demand, particularly from Germany, was good. Some inconvenience was experienced by the export houses from the navigation continuing closed to so late a period. In many cases goods ordered arrived too late for the Leipsic Easter fair, which may, to some extent, interfere with future orders. In June and July it was felt that the continued prosperity of the wool trade would much depend on the result of the approaching harvest. The general feeling being favorable, imparted confidence to transactions, and led to an improvement in the value of most descriptions of

wool. These anticipations having, unfortunately, not been realized, the wheat crop being reported as deficient in quantity and inferior in quality, with the admitted failure of the potato crop to a serious extent, have, for the last few months, subjected the trade to feverish excitement, and much limited the amount of business; other causes have contributed to this result. The large absorption of trading capital in railway and other schemes; the consequent increased value of money and restricted banking accommodation; and, more than all, the narrowed consuming power, arising from the large advance in the cost of subsistence to the great bulk of the population, have operated injuriously on the trade during that period. Notwithstanding these obstructions, we report a less depreciation in value than might have been expected. Stocks of goods are generally light, and of the raw material by no means excessive. We must not omit to notice the intense anxiety with which every section of the trade is awaiting the expected legislative action on the corn laws. Should it terminate in the total abandonment of all import duties on corn and provisions, the change will be of incalculable advantage to the wool trade at large; and we believe that no branch of it will reap more substantial benefit than the home wool-growers.

The growing importance of this place as a wool market is becoming more apparent every year, as shown by the rapidly increasing imports; and, from its contiguity to the manufacturing districts of Yorkshire, Wales, and Scotland, it will, no doubt, before long, command a much larger share of the trade. Our receipts from Australia have hitherto been comparatively insignificant, London continuing to take by far the greatest portion of colonial wool. We are surprised at this, when the many advantages of this port are considered. Its vicinity to numerous consuming districts is certain to insure a large attendance of the smaller manufacturers, who form the chief support of the public sales. In London, the excessive quantities brought forward at one series (sometimes exceeding 30,000 bales) unduly limits the time for examination; operates, even under favorable circumstances, against prices, and, in dull times, is disastrous in tendency. We are convinced that, if a more equal distribution of imports were established, the return to merchants would be more satisfactory.

Australian.—The total receipts from these colonies show a steady increase, which will be much extended by the enhanced value of sheep, having put a stop to the boiling down for tallow. The condition of the last clip has been generally satisfactory. By shearing earlier, the burr was partially avoided, and the season seems to have been favorable for washing. Previously to the first arrivals, which were much earlier than usual, the stocks at home were nearly exhausted. The accounts from the German fairs stated an unusual demand for low and middling qualities for their own consumption, while the French were known to be operating largely in Spain. These circumstances caused the first public sales to go off with great spirit. In October trade began to slacken, though the result of the public sales in London during that month was quite as favorable as could be expected. The large arrivals up to this date (which were, in fact, larger than apparent, owing to the increased size of the bags) induced the wealthy dealer and consumer to stock freely, under the impression, which we think well founded, that the entire import will be required before next season. We are glad to notice throughout the year an improved demand for the better qualities, which will be encouraging to the growers who attend to their flocks. Combing wools have been little in request, owing to the

depression of the worsted trade. This branch is beginning to rally, and promises a better demand in the spring.

Cape of Good Hope.—The shipments from this quarter show great improvement, amply testified by the high rates the best flocks have commanded during the season. This result of judicious management in selection and careful packing will, we feel assured, be sufficient encouragement to perseverance. It is only by such means that former prejudices can be overcome. The best parcels now take equal rank with those from Australia, and are purchased by the trade with full confidence, whilst the more mixed and inferior kinds are an article of doubtful sale. The system of packing unwashed and yolky fleeces with the washed is most prejudicial, and cannot be too strongly pointed out.

Spanish.—Our market has not kept pace with the advanced rates paid for this description on the other side, occasioned by French competition. It has, therefore, been difficult to effect sales at remunerating prices to the importer. The demand of late has been chiefly confined to middle qualities.

Portugal.—Best R.'s have been readily saleable. Most other kinds have been little sought after.

Oporto Mountain.—The demand has been chiefly confined to the best combing parcels; other kinds have been comparatively neglected.

United States.—The import from this quarter affords a striking proof of the beneficial effect of the remission of the wool duty. It has excited great interest and surprise in the trade, and may be considered the greatest novelty of the year. The quantity received to this period, as an experiment, exceeds 3,800 bales, comprising a great variety of qualities. It is to be regretted that the unfavorable turn of trade has been against the operation. In washing and preparing the wools sufficient pains have not been taken; and there is a want of discrimination in the selection of qualities. So far as used they have been highly approved; and we have full confidence that, if got up with care, they would be highly esteemed in this country. The American prairies afford peculiar advantages for the growth of wool; and we believe this branch of the trade will become one of great and increasing importance.

Peruvian and alpaca.—Till within the last few months, the supply of sheep's wool was limited. It is now increased, but the demand is restricted at rather declining prices of late. The imports of alpaca have been rather large. There are no means of ascertaining the exact quantity, but a careful investigation leads us to estimate it at about 18,000 ballots at 80 lbs. each. It must be borne in mind that, during 1844, great difficulties attended the shipment; and the apparent excess of 1845 represents a portion of the previous year's clip. For the first six months there was great activity, and consumers bought freely for arrival. The demand has since been heavy, at almost nominal prices. The high rates abroad render it probable that considerable loss will attend the import.

Buenos Ayres, &c.—Good clean parcels have been in fair request. All other kinds have been rather heavy of sale, and at declining prices, in consequence of the expense and difficulty in getting them cleaned. The unsettled state of the trade on the other side will no doubt interfere with shipment, and may cause an improved demand.

East India.—Under this head we notice a considerable increase, and it is satisfactory to observe that the demand has fully kept pace with it. More

attention has been paid to the assortment, which it is desirable should be persevered in. The increasing demand for low wools will enable the trade to take any quantity that can be furnished.

Russia.—Here the increase appears considerable; but the imports have arrived much earlier than usual. The trade generally has been heavy, except for good combing parcels, which have throughout commanded full prices. The greater portion has been of an inferior description.

Mediterranean.—The items under this head, including Italian, Greek, Smyrna, and the varieties of Turkey wools, have been dull of sale at prices unremunerating to the importer. Some quantity of Egyptian wool has been received, a description which has not before found its way to this country. It is clean and well washed, and a portion is well adapted for combing, but there is a great deal of short mixed with it. Greater care is required in the assortment. The decline in English skin wools has affected its value. We doubt if it will answer except when English combing wools rule high.

English, Scotch, and Irish.—Notwithstanding the depression in the worsted trade, the consumption has reached a full average. Prices have varied little throughout the year, the general range not varying to any material extent from this period last year. Stocks with staplers and manufacturers are light, and not extensive with the farmers, who show more disposition to hold than give way at present.

In exports, the principal feature is the increased amount of woolens sent to the east, which, we understand, form one of the most lucrative branches of the trade with China, the rising importance of which it is difficult to estimate. The exports of woolens to the United States, which have, for some years past, been diminishing, continue to recede; but the tone of the President's message on commercial affairs leads to the expectation that this important market may again revive.

HUGHES & RONALD.

Liverpool, *January* 1, 1846.

From the Liverpool Times, January 1.

The following are the current prices of American wool this day:

Merino fine, clean fleeces	1	8 *a*	1	10
Second do	1	6	1	8
Fine, partially washed	1	4	1	7
Second quality do	1	2	1	4
Ohio fleeces	1	1	1	4
Pulled wool, fine	1	4	1	6
Do second quality	1	1	1	4
Do coarse	0	10	1	1

Liverpool, *December* 31, 1845.

APPENDIX No. 27.

HOGS—THEIR PRODUCTS, &c.

From the Cincinnati Chronicle.

PRODUCTION AND TRADE OF HOGS IN EUROPE AND AMERICA.

The immense production of hogs in the United States, and the heavy trade in them at Cincinnati, demand something more than a mere superficial view of the transactions, at one point, in order to understand the magnitude and relations of the trade. We can furnish the commercial reader with some statistical facts, which will serve as landmarks in taking a broad view of the subject.

In the year 1839 there were in the United States, in all, 26,301,293 hogs. Of this number more than one-half of the whole were in eight States, viz:

Tennessee had	2,926,607
Kentucky	2,310.533
Ohio	2,099,746
Indiana	1,623,608
Illinois	1,494,254
Missouri	1,271,161
Mississippi	1,001,201
Alabama	1,423,873
Total	14,151,983

The States of Virginia, New York, and North Carolina, each, have more hogs than Illinois and Missouri; but we have taken the States of the west and the southwest together to show the result.

Now we want to draw two or three inferences from the number of hogs in the several States, before we compare the production with that of Europe.

1. In the first place, hogs are fatted and nearly supported on maize and Indian corn. They exist, therefore, in the several States, just in proportion to the production of Indian corn. Now, Tennessee has the most, and the three States of Tennessee, Ohio, and Kentucky far more than any other three States, of both Indian corn and hogs. The twenty-six millions of hogs in the United States can scarcely consume less than two hundred millions of bushels of corn! They are, therefore, the greatest market for that article.

2. If we suppose these hogs to average 180 pounds each, and to be worth (as they are) $3 50 per cwt., then this animal alone is, in the United States, worth ONE HUNDRED AND SIXTY-SIX MILLIONS OF DOLLARS, or three times the entire cotton crop for the year 1845. The value of swine in the State of Ohio alone exceeds twelve millions of dollars.

3. It is important to discover how large a proportion of swine is annually killed. There are two sorts of consumption for swine: one may be called the *commercial*, and the other the *domestic* consumption. One is

for family use, and the other for commerce. Almost every farmer's family kill one or more hogs. This is a constant drain on the increase. But, on the other hand, the increase of swine is so great that it will exceed, in one year, the original stock, unless checked. The main inquiry is, how large a proportion of hogs are fatted in order to supply the *provisions* of commerce? In the year 1845 there will have been killed at the various pork packing establishments of Ohio about 500,000 hogs. About 150,000 of these may be set down as from other States. It is fair, therefore, to assume that commerce consumes about 350,000 hogs in Ohio per annum. The present stock cannot be much, if any, under 2,500,000. It follows, therefore, that commerce consumes near about one-sixth part of the stock on hand. We believe that, in the United States generally, this is much too high an estimate; yet the figures, in the western States, will show this result very nearly.

4. But suppose the total is really as great as the facts imply; then it follows (a fact of great moment to the packer) that *no safe conclusion whatever can be drawn from the number of hogs killed in one year, of the real number of the stock that will be brought to market next year.* This is obvious, if the reader will reflect that a given stock of hogs will nearly double themselves in one year, and that yet the number of hogs of commerce is only one-sixth part of the original number! This is the great source of the constant errors made in calculating the number of hogs to be brought to market, and the effects on the market. The truth is, the domestic or family consumption is the great fact, and *that* we cannot arrive at exactly.

We shall proceed to show the number of hogs raised *proportionably* in Europe and America. We have before us McGregor's Statistics, which contains a table of the agriculture and live stock of Europe for 1828. Since then the population of Europe has increased more than ten per cent.; and if we add ten per cent. to the live stock, we shall have the full amount, for this species of stock does not increase in densely populated countries equally with that of other productions.

	Swine of Europe.
Russia	16,380,000
Austria	6,050,000
Great Britain	5,775,000
France	4,950,000
Italian States	2,750,000
Bavaria	1,650,000
Netherlands	1,540,000
Prussia	1,645,160
Sweden	1,320,000
Spain	1,100,000
Portugal	770,000
All other States	2,348,000
Total	46,278,160

To one who is acquainted with the abundance of swine, and the facility for raising them, in the United States, this table must seem extraordinary. It shows that Russia, Austria, and Great Britain, having a population of *one hundred and twenty millions* of people, have only as many swine as the United States, with *twenty millions!*

Eight western States, with a population of *six millions*, have as many swine as great Britain, France, Prussia, and Bavaria, with *seventy-five millions! The European States have not enough Indian corn to feed them upon.*

The proportion of swine between the United States and some of the European States is thus:

United States	to Prussia	6 to 1
" "	to Austria	9 to 1
" "	to Great Britain	7 to 1
" "	to France	10 to 1
" "	to Spain	16 to 1

Russia being a thinly populated country, and having the most *mast*, has the most swine; but, for the converse reason, the southern States of Europe have the least. The United States have six times as many, in proportion, as Russia.

The same disproportion extends, but in less proportion, to other animals. If the people of Europe were a meat-eating people, they could not find a supply in their country. These animals would be killed off in half a dozen years. But they are not a meat-eating people. They live upon every species of vegetable, much as the animals do.

In Ireland they depend upon potatoes: in Scotland, in no small degree, upon oatmeal. Strange as it may seem, thousands of people in Spain and France live, in a great degree, on chestnuts—a food which is scarcely fit for pigs to eat. In some countries they eat rye; and in Russia they mix all the *bran* of grain, making a very coarse, rough bread.

The pork of the western country is chiefly in demand at the Atlantic seaports, for our commercial marine, now rapidly approaching the largest in the world. The adventurous whaleman, the hardy fisher for cod and mackerel, the thousand coasters, who sail in every bay and inlet from the Penobscot to the Rio Grande, all, more or less, eat pork. It serves both as butter and meat, with the fish and potatoes which they have constantly on hand.

The demand for American pork is, on the whole, likely to increase; because the class of people who eat it are increasing, and there is no other country to supply the demand.

From the Cincinnati Chronicle.

BONES, WHIP HANDLES, IVORY-BLACK, HOOFS, PRUSSIAN BLUE, OFFAL, &c.

This is a motley heading, but is exactly adapted to what we have to say. A few days since we took a ramble up Deer creek.

* * * * * * * * *

The creek shore, above Ninth street, is measurably lined, and in one instance, we believe, covered by slaughter-houses—some devoted to disposing of hogs, and others of cattle—tanneries, bone-mill, grease-trying establishments, and similar odoriferous vocations; and in the winter season the stream should be known as bloody run, for such it literally is, its

color being nearly scarlet. A brewery adds its mite, as well as a steam lard and tallow manufactory; to the general aggregate of which the creek is the depository.

But, however undesirable is the brink of this murmuring stream, the vale through which it runs is nevertheless a fountain of wealth. Among the establishments there is one which is a common receiver of nearly all the offal of the city slaughter-houses. From it is turned out an immense amount of grease and inferior lard. A large portion of the daily market beef-legs and shanks is purchased by the proprietor; and, after the marrow and grease are extracted, the bones are sold for the various purposes of button-making, whip handle finishing, the manufacture of China-ware or porcelain, and also ivory-black. Of the latter, large quantities are used in the manufacture of shoe blacking; and a mill in this noted vale is expressly appropriated to the grinding of bone, pith of horns, &c., for the manufacture of black.

Of the small bone used for black and porcelain, this house ships to foreign ports, mostly Europe, about 400,000 pounds per year; and of the large bone, which are principally used for the ferules and butts of whip stocks, and the manufacture of buttons, about 130,000 pieces. These quantities are exclusive of the amount consumed here, which is very considerable, particularly of the former kind. A few years ago, nothing of the kind was done here, and, as far as bone was concerned, was entirely a waste. The prices here are, for the small, $16 per ton, (a large contract closes with 1844, for export to Europe, at that rate, packages included,) and for the latter, $10 per 1,000 pieces. The price last year was $8.

Soap-grease is the great staple of this Vesuvius, very large quantities of which are shipped to the eastern cities. Forty thousand dollars' worth was mentioned to us as the value of what is at this time on sale in New York alone. The prices here now are, four cents for No. 1, and three and a half for No. 2.

One of the other articles made to a great extent is neat's-foot oil, from the nether legs and hoofs. This sells, by wholesale, at 62 to 75 cents per gallon.

Another is sausage skins, with which not only our own market is supplied, but shipments are contantly making to the south and east. They sell here at $10 per keg—size, the common lard keg.

Hog's bristles are another thing prepared by this and other houses, or house in the city; and of this article large shipments are also made, both of the combed and tied, used by saddlers, shoemakers, &c., and of the curled. The former kind sells at 30 to 35 cents per pound. The curled are used for the same purposes to which curled hair is applied—mattresses, cushioned chairs, sofas, &c.

One other thing we learned in this our evening ramble, was, that we have with us a manufactory of Prussian blue. The stock from which it is made is cattles' hoofs and plucks, and the blood of hogs and cattle. The hoofs command $16 per ton. The manufacturer is a German. It is but a year or eighteen months since he commenced operations, and cannot be said to be fairly under way, but has sufficiently tested the experiment clearly to demonstrate the practicability of successfully competing with the foreign article, both as to quality and price, and he expects in a few years to be able to consume a very large portion of the blood to be obtained here. We were also told of an instance of a foreign demand for blood. The facts

we have stated are a few instances of the economy with which science is capable of making us acquainted, and of the value of the skill by which it can be effected. Shall we cultivate the arts and sciences, and encourage skill and enterprise in our country?

From the Popular Record of Modern Science.

THE VALUE OF A DEAD HORSE IN PARIS.

The use to which dead horses are put may be gathered from a brief account of the establishment at Montfaucon, near Paris, consisting of what we should call knackers' yards. After the horses are deposited there, the hair of the mane and tail is cut off, which amounts to about a quarter of a pound; the skin is then taken away, which is disposed of to the tanners, and used for various purposes. The shoes are sold as old iron; the feet are cut off, dried, and beaten, in order to make the hoofs come away, or are left to putrefy till they separate of themselves, when they are sold to turners, comb makers, manufacturers of ammonia and Prussian blue. Every morsel of fat is picked out, collected and melted, and is used for burning by makers of enamel and glass toys, greasing shoe-leather and harness, and manufacturing soap and gas. The workmen choose the best pieces of the flesh to eat, preferring those about the head, and sell the rest for dogs, cats, hogs, and poultry. It is also much used for manure and making Prussian blue. The bones are disposed of to cutlers, fan makers, &c., and are often made into ivory-black; and also occasionally serve as fuel for melting the fat, and for manure. The sinews and tendons are sold to the glue makers; the small intestines are made into coarse strings for lathes, &c., or serve as manure. Even the maggots, which breed in great quantities in these yards, turn to account, for many are sold to the fisherman; and the rest, when developed into flies, attract such numbers of swallows, that the Parisians make a shooting ground of the neighborhood.

PORK PACKING AT CINCINNATI.

The books of the several slaughtering-houses in Cincinnati show the following number of hogs packed during the past season at that place. The statement is no doubt correct:

Cincinnati—J. W. Coleman & Co.,	4 houses	130,959
John Jaquess,	2 "	48,403
Pugh & Co.	1 house	38,384
J. C. Hughes & Co.	1 "	34,502
Total		252,246
Covington—Ashbrook & Hughes,	1 house	12,736
Estimate for wagon, railroad, and river receipts		22,500
Making the total number packed at this point		287,482

The following account of the number of hogs packed at this city each season for the last fourteen years, and also the price per hundred pounds at which the market opened each year, may be useful as a future reference:

Year.	Number.	Price.
1832-33	85,000	
1833-34	123,000	
1834-35	162,000	
1835-36	123,000	\$1 00 a \$6 25
1836-37	103,000	6 00 a 7 00
1837-38	182,000	3 50 a 4 00
1838-39	199,000	5 50 a 6 00
1839-40	95,000	3 00 a 3 50
1840-41	160,000	3 50 a 3 75
1841-42	220,000	2 00 a 2 50
1842-43	250,000	1 62 a 2 00
1843-44	240,000	2 25 a 2 65
1844-45	213,000	2 50 a 2 70
1845-46	287,000	4 00

APPENDIX No. 28.

POULTRY—FEEDING CHICKENS—PROFITS OF POULTRY.

From the London Gardeners' Chronicle.

POULTRY.

The economy of poultry may be classed under three heads: first, in their natural state, which is the department of the naturalist; second, in their domestic state in the country, with a full range of the farm-yard and fields, in which the poultry-keeper is concerned, for his profit; and, third, in their artificial state, in or near towns, in pens or yards, which will chiefly engage my attention in the present article. The best and cheapest method of feeding I must leave to be detailed by those who keep poultry in large quantities.

Shelter.—Fowls should always be kept in a dry, warm, sheltered situation, (a southerly aspect is to be preferred,) for they enjoy and benefit greatly by the "warms in the sun," as well as requiring protection from its scorching rays, and a secure (storm) shed for rainy weather. The roosting-house and laying-house, if separate, should communicate, that early layers may have early access to the nests, and also communicate with the storm-shed, for the fowls to run in in security, if they should leave their roosts early in the morning. The nests should be numerous, either in boxes or baskets—not too deep, but roomy; some situated high, some low, and as independent of each other as possible; each supplied with sweet, short, and soft straw, and a small nest-egg or two of chalk, the size of a pigeon's egg. If the nests be too deep, they break the eggs in jumping in and out; and if the nests are not roomy, sitting hens have no room to turn easily, and consequently break the eggs by not being able to get to them softly. They then eat the broken eggs, which gives them the habit of doing so at other times. They should roost warm at night; the perches high from the ground, and of easy access, by means of lower ones or ladders. The more lightsome the house, the better for promoting dry air and a free circulation; besides, fowls cannot see at all, being quite stupefied and helpless, in the dark; consequently the feathered tribe always retire to roost before the sun goes down. Shutters to the glazed windows are unnecessary, except for better security, or to prevent fowls from leaving their roosts too early in the morning, to disturb ticklish neighbors; otherwise they come out almost as soon as daylight begins to appear. The feeding places, if under cover, so much the better, as a precaution for wet weather, and as far as possible removed from the nests, that the hens which happen to be laying at the time, or which may be sitting, may not be disturbed and enticed off their nests and eggs at improper times. Being evidently natives of a warm country, they are scarcely yet perfectly acclimated in our variable and colder regions; although so widely diffused, from time immemorial, over the whole face of the globe, they have retained a peculiar susceptibility of damp and chillness—most of their diseases arising from rheum or catarrh—catching colds. The lungs of fowls are particularly tender: the finer the species, the less is it hardy.

Cleanliness.—Fowls, being cleanly by nature, thrive when regularly attended, but degenerate and sicken if neglected. In an artificial state of ex-

istence they require to be supplied by art with what, in nature, they would obtain for themselves. For this purpose they should have a regular supply, in some convenient part of their shed, of sifted cinders daily, to roll in and cleanse themselves, and which should be often changed. This precaution will keep them entirely free from vermin of any description.

Green food.—This being quite as necessary for health as corn, to supply this requirement of nature they should have daily a good supply of sweet and fresh green vegetables. Cabbage and lettuce are the best, (turnip-tops and watercresses,) but on no account any sour plants, which scour them, (as do spinach, the cuttings from grass-plats, and most sorts of garden-seeds,) as their instinct does not serve them to choose the wholesome from the noxious weeds, more than it does animals that happen to stray into a clover-field, or happen to receive too large a quantity into their stables. I have known them to burst. Green food, with fowls, is an astringent—the very reverse from what vegetables are with us. This fact will not appear so surprising when it is recollected that one takes them raw, and the other cooked.

A plentiful supply of clean water daily, in well-cleansed vessels, and wholesome food, is necessary. Frequent changes, and mixtures of corn, improve the appetite. Barley is decidedly their staple food in this country; Indian corn, or sometimes rice, mixed, for a change. Oats occasionally; but, in too large quantity, are apt to scour. Occasionally buckwheat and hemp-seed, as a stimulant, mixed with the barley for a change, are very beneficial, particularly whilst moulting. One meal may be composed of boiled or steamed potatoes, well mashed up whilst hot, with a portion of barleymeal or oatmeal for a change, but which must be allowed to remain till cold. Books, copying errors from one another, make a great mistake in advising food to be given hot. It is unnatural: they have no good cooks amongst them in their own state; and it is decidedly injurious to their digestive organs, except when fattening, when they are doomed soon to be killed for table. Feed twice a day at least, or three times, if not to fattening; morning, early, before the usual hour for laying, if possible; at noon, (the noontide meal may be the potatoes, as above directed,) and before sunset, (not later than four o'clock,) that they may go to roost by daylight, or they will go without their food. Regularity greatly tends to health, and disturbance of any sort is very hurtful. Rice occasionally, boiled in a cloth, greatly increases its bulk, and they are very fond of it. Reaumur says that great economy is derived from steeping or boiling the barley, to increase its bulk, when they will be satisfied with one-third less quantity. But I cannot speak of this from my own experience, nor can I say that beneficial effects are produced by giving them much flesh, raw or boiled. But fat, as advised in books, produces scourings; spiced or salted meats, and kitchen stuffs, are certainly pernicious to their stomachs. In fattening for the table, when they are not required to live long, or show fine feather, this may not be of any consequence. Will some of your practical correspondents enlighten us? They require in pens or small yards, in towns, to be well supplied with grit, sand, and small gravel; slacked lime, and old mortar pounded, is very beneficial, and serviceable in assisting to make the pen or yard dry. I will add to the above, that there is no economy in keeping poultry in towns in small quantities, which is always exceedingly expensive, if well fed and taken care of; which, however, is compensated for to those who wish to make certain that the eggs are quite fresh and newly laid. All calcula-

tions of expense must be erroneous, there being so many contingent expenses. As a source of trade, much depends upon rearing the best breeds, to be early in the season, laying in stock and store at proper times, having a ready sale for produce, and to "buy cheap and sell dear."

KEEPING POULTRY—PROFITABLE BUSINESS.

A correspondent, living on a ten-acre lot near Port Richmond, Staten island, has sent the New York Sun the following copy of an account with his poultry-yard for the year 1845, viz:

Seventy-one hens—Dr.

To grain	$7 00
To repairs of coop	1 25
To pieces of meat and charcoal during the year	3 10
To profit and loss	93 65
	$105 00

Cr.

By 11,640 eggs	$65 00
By 270 chickens	40 00
	$105 00

The male birds, numbering six, are of course not counted as "hens," although the expense of keeping them is included in the items on the Dr. side of the above. He had on hand at the end of the year 58 chickens, 71 hens, and 6 cocks, valued in all at $24—the amount he entered them at in his stock account. The profits of the year, amounting to $93 65, form a respectable item in domestic economy. Why may not our citizens improve on this example? A coop will occupy but a small space in a yard, and poultry and fresh eggs are generally high in the Baltimore market.

Baltimore Sun.

From the Agricultural Almanac.

PROFIT OF HENS.

It is frequently asserted that poultry is more plague than profit. But this, like many other assertions, must be taken with proper qualifications. We contend, if you have a good breed of fowls, take proper care of them, and are near a reasonably good market, that the keeping of fowls is as profitable a business, for the amount of capital invested in it, as a farmer's boy or the women of the family can be engaged in. To prove this, we will cite one example. When we were at the pleasant farm (last September) of Messrs. H. and J. Carpenter, of Poughkeepsie, their brother, Mr. Gerard Carpenter, showed us an account of the number of eggs laid by their hens up to that time from the 1st of January. It was so exact and satisfactory, that we requested him to continue it to the end of the year; which he has obligingly done, and now here is the result.

He commenced, on the 1st of January, 1844, with 67 hens and 3 cocks. Out of this flock were sold and lost, by the 1st of May, 7 hens; from that time up to the 16th of September, they lost two more. Since then we are not informed what the losses have been. It would probably be fair to set down the average stock of hens during the year at 60 head. These laid in the following months, all of which were consumed by the family or sold—

In January	191	eggs.
February	400	"
March	892	"
April	1,037	"
May	1,086	"
June	700	"
July	838	"
August	740	"
September	540	"
October	113	"
November	21	"
December	none.	
	6,558	"

In addition to this number, it is supposed full 300 were used for sitting, got lost, broken, or spoiled, which are not taken into the above account. The average price that the eggs brought at Poughkeepsie was $1 per hundred, which makes their value - - - - - - $65 58
Chickens raised, 101—at 20 cents each - - - - 20 20

$85 78

We suppose that this flock of hens may have consumed grain during the year equivalent to 70 bushels of corn. This is allowing three-fourths of a gill per day throughout the year to the flock of hens, and nothing to rear the chickens; but as, during the summer, hens that have the range of a farm need no feeding, this quantity of grain is considered ample for their support.

At 50 cents per bushel for the corn, this would make the expense of their feed $35, which, deducted from the value of eggs and chickens, leaves a net profit of $50 78. It is considered that the manure of the hens, and the insects they destroy during the season, are equivalent to taking care of them.

The actual feed of the above hens was as much corn, mixed with a few oats, as they would eat; the grain being placed where they could always get at it. In the winter they had a little meat. They were not confined at all, and had access to lime and gravel while the ground was covered with snow. Their roosting-place was comfortably enclosed under the barn.

APPENDIX No. 29.

CULTIVATION.

From the Albany Cultivator.

An interesting experiment, showing at the same time the benefits of stirring the soil, and also the danger of drawing false conclusions, is given by L. Vernon Harcourt, in the agricultural department of the London Gardeners' Chronicle.

He had seen a statement that the tailings of wheat, called "chicken-scraps," being in fact only the refuse of the grain, would yet produce a good crop of the heaviest, fullest seed. Disbelieving it, and being desirous of undeceiving the farmers by proving its fallacy, he proceeded to try the experiment. Accordingly, a small plat of ground was sown, one-half with good wheat, and the other half with tailings. On returning home, after an absence of some weeks, in the spring, he was surprised to find the latter covering the ground as thick as the grass on the meadow; but found, upon inquiry, that the person having charge of the experiment, considering the seed good for nothing, had sown five or six times as much of it as of the other. As this thwarted the design of a comparison, half the thick sown was directed to be hoed out till of the same thickness as the other from good seed. The other half of the thick sown was left to take its chance. At harvest, the first twelve plants in one row of each sort were taken as a sample, and the produce weighed as follows:

	Grains.	Average ears per plant.
12 plants from good seed, weighed - -	926	6.6
12 plants from tailings, left thick, weighed -	351	3.8
12 plants of the same, thinned, weighed -	1133	7.8

It is of course evident to every intelligent person that the increase in the product of the hoed portion was owing to the cultivation by hoeing, which is further proved by the meagre supply from the unhoed wheat from the tailings. But the experiment performed under other circumstances, and with other seed, might have led to very erroneous conclusions.

ACCOUNT OF AN EXPERIMENT IN DEEP PLOUGHING.

BY REV. JOHN JAFFRAY, DUNBAR, EAST LOTHIAN.

The experiment was made upon a small field, which is sixty-five feet above the level of the sea. The soil is sandy, resting upon a sub soil of sand and gravel of great depth, and so thoroughly drained by the declivity of the surrounding lands, the want of moisture is its natural effect. There is but little difference between the soil and the stratum on which it rests beyond what culture and manure have made; but, from sinking of gravel, treading of horses, and pressure of the plough, year after year, and age after age, the sub soil had become crusted, hard, and beaten, as a road. In short,

from shallow ploughing, there was but little of cultivated earth ; and, as on all such soils in dry seasons, the crop was scorched aud scanty. With a view to render this field fruitful in any season, it was sub-soiled with the Deanston plough, eighteen inches deep, and sown with wheat for crop in 1837. The great vigor and luxuriance of the crop attracted general notice ; and it must have yielded an extraordinary increase, if it had not been lodged by wind and rain shortly after the ear appeared. Therefore it gave only thirty eight bushels of grain to the acre, but three tons of straw, which proved its great strength. To this crop, one of potatoes and two of wheat succeeded ; but it is the culture of this field for crop in 1841, and the result, which chiefly constitute this report.

It was all equally dressed with seaware ; and four acres of the same quality and description were measured and staked off. Two of these acres were ploughed twelve inches deep, with two horses, and two of them eighteen inches deep, with four horses. These two portions in all other respects were cultivated and managed exactly alike. They were planted with potatoes of the Don species in the last week of April, eight inches deep, twelve inches asunder, and in drills thirty inches wide, running at right-angles to the furrows of the experimental ploughing. The potatoes were planted deeper than usual, therefore the shoots were longer in coming through the ground ; but when they did appear, it was with great strength and regularity. They expanded their broad deep-green leaves, and grew vigorously in the dry sandy soil, in a very severe and long continued drought. It was soon evident that the deepest ploughed portion had the advantage. The stems and branches of its plants were stronger, and they first covered the ground.

The potatoes were lifted in the last week of October, when it was found that the land ploughed twelve inches deep produced fifty seven bolls per acre, and the land ploughed eighteen inches deep produced sixty-nine bolls per acre, being a difference of twelve bolls per imperial acre, of four cwt. to the boll.

* * * * * * * * *

The potatoes from the deep tillage were larger, more of one size, had fewer small ones, and not so many of a green color as those from the other division.

The quantity on the deep tillage is eighty-seven bolls per Scots acre, which is a good crop for any year ; and it will readily be granted that it is far above the average of the district this year, many fields not producing half a crop. * * * But though this is a greater crop for the season, it must have been still greater if the field had been less exposed, as it has no shelter ; and three days of very violent wind in the first week of August broke down the plants, which, from their great luxuriance, were then very tender, and checked their growth.

The practical conclusions to be drawn from this experiment are—

First, that deep ploughing increases the produce.

Next, that, as both portions of the land used in the experiment were opened up eighteen inches deep by the sub-soil plough for crop in 1837, the full benefit of that operation is not obtained till the earth so loosened is again ploughed up. And the reason is evident ; for it is then only that the soil is deepened, by an addition from the sub-soil with which it is intermixed, and rendered more fruitful.

Lastly : if deep ploughing increases the produce, it increases also the sup-

ply of vegetable manure; and a greater portion of manure, added to improved culture, must produce a progressive increase of fertility and of produce.

From the American Agriculturist.

BENEFIT OF SUB-SOIL PLOUGHING.

A farmer from Connecticut informs us that he has raised a field of corn the past summer which he thinks will average 80 bushels to the acre, and that he selected half an acre of the best, from which he gathered 134 bushels of ears, all sound and well filled out. That while his neighbors' corn adjoining was withering with the drought, his was luxuriant; and he attributes the whole of his success to sub soil ploughing. Another fact he stated was, that the whole expense of planting, cultivating, and harvesting, after the ground was ploughed, did not exceed $3 per acre; that he did not touch it with a hoe, but worked it with a harrow and cultivator; and what few weeds were not reached with these, about the hills, were pulled up by hand before going to seed. We intend to visit his farm next summer, when we shall have something further to report.

NEWCASTLE COUNTY AGRICULTURAL SOCIETY.

To the Committee on Farms:

Gentlemen: In competing for the valuable premium offered by the society for the best farm, taking into consideration the former and present condition of said farm, I proceed to give as correct a statement as my memory and a few notes taken from time to time will permit.

On the 4th of March, 1834, I removed to Wheatland, which I had purchased of J. A. Bayard, on a credit of ten years, in 1832. This part of the farm, which contained about 360 acres, is situated on Bohemia Manor, partly in St George's Hundred, Newcastle county, and partly (about 30 acres) in Cecil county, Maryland. It was very poor at that time, having always been rented from the first settlement of the country—which, by the grave-stone of the original proprietor, Agustine Herman, was in 1669—till the time of my purchase.

Wheatland, previous to my purchase, contained 524 acres, nearly all of which was tillable, there being no wood or other waste land upon the farm. It had always been worked upon the three-field system, one of which was planted with corn; wheat was then sown in the standing corn after the fodder had been gathered; then, after the wheat came off, the stubble was pastured one year, without having any clover or other grass seed sown. The next year it was again planted with corn, and so on with that impoverishing course; for which a fixed rent was demanded of 700 bushels of corn and 125 bushels of wheat. No oats were allowed to be sown. The 700 bushels of corn, at the present price of 40 cents per bushel, would amount to $280; the 125 bushels of wheat, at the present price, (90 cents,) would be $112 50—together, $392 50—and this for the farm before any was sold off; but reduce it to the ratio of the present size of the farm, say about one third off, and you have a rent of $260, out of which the repairs

were to be paid. Such was the exhausted state of the land, that it scarcely paid six per cent. (after deducting for repairs) on $4,100, the amount of purchase money that I was charged with.

For several years I got but poor returns for my labor, not having the means or energy to improve till 1837. In that year I concluded to run my face, and make an effort towards improvement with lime; and up to 1839, I had put on about 12,000 bushels, at a cost at the kilns of 20 to 22 cents per bushel. By 1840, I had seen and felt the good effects of the lime, and determined to complete the first dressing of all my arable lands, as well as my Cote Brilliant Farm (better known as Gum Bush) of 380 acres, which I had also purchased at a credit for less than $8 per acre, and was situated near by, as Wheatland, my homestead. In that year (1840) I purchased 10,000 bushels of lime, at a cost of 17 cents per bushel delivered at the landing of the canal, distant about four miles from the farms. Here I again had to run my face; but this time I went to the lime burners on Schuylkill, where I would advise all honest Delawarians, that have not limed, to go at once, for to this day honest Delaware faces are in good repute there. They are no repudiators. And while on the subject of lime, I will state that one lime burner, William Mogee, has sold in New-castle county, within the last six months, 145,000 bushels of lime, of which 90,000 bushels have been delivered.

Previous to 1840 I had sown clover and other grass seeds pretty freely—one year as much as 45 bushels; and the same year I purchased 20 tons of plaster. At first I got but poor return even for my lime—I suppose for want of vegetable matter; but when my clover had grown so as to make a swarth or lay for turning under, my crops began to increase even beyond my expectations. The crops for the year 1844, which closed with my late wheat crop, were all got out and sold by the 25th of July, 1845, producing the following results:

Oat crop light—not many sown—crop sold for $209—rental share	$104 50
Corn tillage large—97 acres, including an orchard of 4 acres, not well tilled, produced 3,000 bushels—rental share, 1,500 bushels, at 40 cents - - - - - - -	600 00
The wheat crop amounted to 2,820 bushels, exclusive of brock or rakings—the rental share one half, or say 1,410 bushels, at 90 cents - - - - - - -	1,269 00
	1,973 50
This was grown on two fields, one of which, of 97 acres, a clover ley, well turned under, produced 1,872 bushels, exclusive of brock, which would have made this field amount to over 20 bushels to the acre.	
Add 64 bushels of brock, at 90 cents per bushel - - -	57 60
	$2,031 10

The other field of wheat contained about 60 acres. The product of this field was 948 bushels, exclusive of rakings; or, had they been included, the yield would have exceeded sixteen bushels to the acre. This field had been hard cropped, for the wheat followed corn, which corn had followed wheat stubble of the year previous, without manure or clover. Indeed, this field had produced nine crops in twelve years, with but little

manure at any time, it being farthest from the farm yard; and my plan is never to haul manure to the far side of the farm, whilst I have poor land near by. The principal help this field has had was 40 bushels of lime to the acre, put on in 1838, and two crops of clover turned under; and on a part of the field a crop of oats was turned under that had been injured by the hail storm of 1840.

The rental value of these three crops of oats, corn, and wheat, may then be set down at $2,031 10, the usage of this part of the country being one-half of the grain for rent. In the upper Hundreds, near the manufactories, an additional amount in money would be obtained for the privileges of dairy, poultry, eggs, &c.

The rental value, as above set forth, you will perceive at a glance, now pays an interest of six per cent. on a capital of $33,850. The original cost of the farm, or investment, was, as you will also perceive, $4,100, and that a credit. I will leave you, gentlemen, to calculate the yearly dividends on the investment.

JOHN JONES.

From the Farmers' Monthly Visitor, September 30, 1845.

FRENCH AGRICULTURE.

The *Presse* publishes some extracts from a work presented to the agricultural congress, now sitting at the palace of the Luxembourgh, by the author, M. Catineau Laroche, and entitled *France and England compared with respect to agricultural, manufacturing, and commercial industry, and the consequences to be deduced from this comparison.* It appears from this work that England, in comparison with the extent of its surface, possesses four times more cattle than France. And as it is not possible to pursue a judicious system of agriculture without manure, and as the feeding of cattle is the most productive of supplying manure, it follows that before France can compete with England in agricultural wealth, she must increase her stock of cattle; but in order to do so, she must increase her pasture lands or meadows. "France," says M. Laroche, "possesses but 4,200,000 hectares of natural meadows, or only one-sixteenth of her cultivated soil. From this calculation, it may be easily comprehended how insufficient is her supply of green food, and that it becomes absolutely necessary that she should substitute another to the triennial system at present in use." M. Laroche concludes by stating that, "if the alternate system of cultivation pursued in England was introduced into France, the produce of corn would be doubled within twenty years. Fifty-five years since, the produce of Great Britain was estimated by Arthur Young at three millards. At present it is estimated at five millards seven hundred and twenty-five millions."

[Messrs. Gowen's, Webber's, and Slingerland's statements respecting cultivation, &c., are omitted for want of room.]

APPENDIX No. 30.

ON ARTIFICIAL MANURES.

BY PROFESSOR JUSTUS LIEBIG.

My attention has often been directed to the question whether, acccrding to our experience and the present state of science, a manure might not be composed which could replace the genuine guano in its effects, and whether I could not, by a series of experiments, point out a way of preparing one equal to it in all its chemical and physical properties. You are well aware, sir, that we know with certainty all the elements of the guano, as well as of the urine and solid fæces of men and animals. In like manner, it seems to have verified the opinion which I have laid down in my work on agriculture, that the salts manufactured in the laboratory have the same effect on the growth of the plants, if they are embodied to the fields in the same forms in which the animals furnish them in their excrements. This must be evident to every one who knows that, to produce these compounds in the laboratory, the same agencies and means are made use of which are employed by nature. The fabrication of a manure, equal in its composition and effects to the solid and fluid excrements of animals and men, seems to me one of the most essential demands of our time. * * * The following may be regarded as the essential constituents of a powerful manure, applicable to all sorts of soils:

Earthy phosphates.—The most important of these is *phosphate of lime*, which occurs in nature as a mineral called *apatite*. It is the principal element in the bones, which, it may be observed, have been found most efficacious, if calcined; consequently deprived of their animal matter. The rapidity of the effects of phosphate of lime on the growth of plants depends upon its greater or lesser solubility. Its amount of glue (gelatine) diminishes this solubility, if the soil is rich in vegetable matters, which furnish carbonic acid by their decomposition, and which acid is required for rendering the phosphate of lime soluble in wtaer, and introducing it into the organism of the plants. In the calcined state, the bones act sufficiently quickly; but in those soils in which this cause of solubility is wanting, their action is slower. In my work I have recommended the addition of a certain quantity of sulphuric acid, both in order to render the bones more soluble and to change the neutral phosphate of the bones into gypsum, and into a phosphate which contains more superphosphate of lime. I have been informed that this advice has been most extensively adopted; that the superphosphate of lime has been found to be a most efficacious manure, and that it forms already a most important article of commerce. A second earthy phosphate, not less important, is the *phosphate of magnesia*, which, it is well known, enters, in a still larger proportion than the *phosphate of lime*, into the composition of the grain.

The *alkaline phosphates*, although not originally found in nature, are important elements of the seeds of grain, of peas, beans, &c. A rational farmer must provide them in sufficient quantities to those plants which require them for their development, from knowing human excrements in-

crease the produce in grain in a far greater proportion, because they *contain* alkaline phosphates, than the animal excrements, in which they *do not exist*.

The *alkalies* (potash and soda) must be constituents of every rationally composed manure, because by them the original fertile condition of the fields is preserved. The soil which contains the *alkalies* in too small a quantity is, perhaps, fertile for grain; but it is not necessarily so for turnips or potatoes, which require a great quantity of alkali. By supplying an alkaline manure, fallows for the cultivation of those plants which are grown during the time of fallowing become less necessary.

Sulphate of potash is a constituent of all plants, although in small quantity, as well as *common salt* and *chloride of potassium*, which are found in milk in rather a large proportion. The *salts of lime*, especialy *gypsum*, is an important nourishment for the leguminous plants. Salt is never wanting in all sorts of soils; it is a constituent of all rocks, by the decomposition of which all productive soils are formed, and the cerealia find it every where in sufficient quantity, and in a form capable of being taken up by the plants, *if the alkalies are provided* wherever they are present in too small quantity.

Salts of ammonia.—It can be regarded as certain that the azote of the plants is derived either from the ammonia of the atmosphere, or from the manure which is provided in the shape of animal fluid and solid excrement, and that azotic compounds exercise an effect on the growth of plants only in so far as they give up the azote, in the form of ammonia, during their decomposition and decay. We may, therefore, profitably replace all the azotic substances with compounds of ammonia.

Decaying vegetable matters, which contain carbon, are useful to the fields in so far as they provide a source of carbonic acid; but they are not quite indispensable in manure, if the latter be rationally combined, as the atmospheric air is an inexhaustible source of carbonic acid, from which the plants draw their carbon, if in the manure the mineral substances are provided which are necessary for the assimilation of the carbonic acid. These are the substances which *together* give fertility to the soil; but although each of them may, under certain circumstances, (viz: where the soil is defective in it, or where it is not indifferent to the plant to take up one instead of the other, as, for instance, may be the case with soda instead of potash,) increase the fertility, no *one* of them can be regarded as a manure, according to the common meaning of the word, for the simple reason that only *all of them in certain proportions* will fulfil the purpose for which the common manure is applied. This purpose is the restoration, or an increase of the original fertility, and by manure we must replace all the elements of the plants which have been taken away in harvest, or which are contained in the plants which we are desirous to cultivate.

What, then, are the constituent elements of the soil which we remove by the straw, seeds, tuberculous roots, stalks, &c., of our plants of culture? It is obvious that we must know these first, in order to *restore* them in sufficient quantities. To this we answer by giving the analysis of the ashes of plants and their seeds. Hundred weights of the ashes of the following plants contain—

	Beans,	Straw of Peas,	Potatoes.	Ashes of Clover,	Hay.
Alkaline carbonates - - -	29.38	12.43	4.34	31.63	3.0
Carbonate of lime - - -	39.50	47.81	43.68	41.61	6.9

	Beans,	Straw of Peas,	Potatoes.	Ashes of Clover,	Hay.
Phosphate of lime - - -	6.43	5.15	5.73	11.80	40.8
Phosphate of magnesia - -	6.66	4.37	7.82	0.91	
Sulphate of potash or soda - -	12.40	10.15	–	2.23	8.84
Magnesia - - - - -	–	–	–	–	21.8
Chloride of sodium or potassium -	0.28	4.63	2.8	2.27	3.06
Phosphate of iron, Phosphate of alumina, &c. } -	–	–	–	–	12.7

In these analyses silica has not been taken into account, as it is found in all soils, and need not be supplied. One hundred weight of the ashes of potatoes, and the seeds of the following plants, contains—

	Potatoes.	Wheat.	Beans, (Vicia faba.)
Alkaline phosphates - - -	15.75	52.98	68.59
Phosphate of lime and magnesia -	9.00	38.02	28.46
Phosphate of iron - - -	–	0.67	
Sulphate of potash - - -	15.07	–	1.84
Carbonate of potash and soda - -	51.70		

What is wanting in the 100 of the above analyses is sand, coal, or loss. From these researches, it appears that for stalks and leaves we require other elements than for seeds. The former contain no alkaline phosphates, but they require for their development and growth a rich supply of alkaline carbonates and sulphates. On the other hand, the carbonates are entirely wanting in the seeds, but the latter are very rich in phosphates. It is sufficiently obvious that a rational farmer must supply *both*, as well as all the others. If he supplies only phosphates, and does not restore the alkaline carbonates, his soil will become gradually barren; it will be exhausted in those necessary elements for the development of stalks and seeds, without which no formation of seed can be expected. If he supplies the alkalies, lime, and sulphates alone, in a given time he will get no more grain. All constituent elements of the manure, if they are supplied *alone*, have that great defect—that by them the soil is impoverished in other equally important elements. No *one* of itself can maintain the fertility. Keeping this in view, we may easily judge of the comparative value of artificial and natural manures, and all the various *arcana* which have been praised as *panaceas* for exhausted soils.

It is not less easy to understand why the farmers have such different opinions on the relative value of the constituents of manures; why one whose farm is rich in phosphates produces an uncommon fertility by the application of nitrate of soda, or the supply of alkalies, while another does not see any favorable effect at all; why bones (phosphates of lime) produce in many fields wonders, and are not of the slightest benefit to others, which are deficient in alkalies or alkaline salts. From the composition of animal manures it results, with certainty, that, by applying the latter, (solid and fluid excrements of men and animals,) we supply to the soil, not one, but all the elements which have been taken away in the harvest. Fertility is restored to the field by a corresponding supply of this manure, and it may be increased by it to a certain limit. This will be the more intelligible if we compare the mineral elements of the urine of horses and cattle with the mineral elements of herbs, straw, roots, &c., of our cultivated plants. It will be found that in their quality they are perfectly identical:

66

	Urine of a horse.	Of another.	Of oxen.
Carbonate of lime	12.50	31.00	1.07
Carbonate of magnesia	9.46	13.07	6.93
Carbonate of potash	46.09	40.33	77.28
Carbonate of soda	10.33		
Sulphate of potash	13.04	9.02	13.30
Chloride of sodium	0.55	–	0.30

These salts in the urine of horses amount to nearly 4 per cent., in that of oxen to $2\frac{1}{2}$ per cent., of their weights. If we compare the composition of these different sorts of urine with the composition of the straw of peas, beans, and potatoes, of clover and hay, it will at once be obvious that in stable dung we replace by the urine the alkaline carbonates which we have removed in harvest. What, in this urine, is wanting in phosphates and carbonate of lime and phosphate of magnesia, forms the principal constituent elements of the solid excrements of animals; *both together* (solid excrements and urine) restore the field to its original composition, and thus a new generation of cultivated plants meet with the mineral ingredients necessary for their development. If we further compare the guano and the fæces of men with the composition of the animal urine, the analysis shows (reference, my book on agriculture) that both are entirely defective in *alkaline carbonates*. They contain phosphates and sulphates, as well as chloride of sodium, but no free alkali. They contain phosphate of lime and phosphate of magnesia. In short, their elements are in *quality* identical with the important mineral elements of the seeds of wheat, peas, beans—(reference, the analysis.) The urine of swine is in its composition intermediate between the urine of man and horses.

Analysis of the urine of swine.

Carbonate of potash	12.1	The solid excrements of swine contain principally phosphate of lime.
Phosphate of soda	19.0	
Sulphate of soda	7.0	
Chloride of sodium, Chloride of potassium,	53.1	
Phosphate of lime, Phosphate of magnesia,	8.8	
Traces of iron,		

What the practical results of a knowledge of the composition of these manures are, is clear. If it were possible to provide our fields with the dung of swine in sufficient quantity, we would replace by it, in a soil which contains *silicia* and *lime*, all the remaining elements of the plants. The field might be made fertile for all kinds of plants. We have in it not only alkaline phosphates, the principal elements of the seeds, but also alkaline carbonates, which are required by the leaves, stalks, and roots. This purpose cannot be attained, however, by manuring with guano or human excrements alone, but perfectly so by stable manure, from its containing alkaline carbonates. If I have said that stable manure contains the mineral elements of the nurture of the plants, exactly in a state and condition in which they are furnished by nature—that a field manured by it resembles the primitive state of America and Hungary—this assertion will not be

found exaggerated. It is certain that stable dung contains no alkaline phosphates; but nature does not furnish to the plants these elements even in the most fertile soil, although we find them in large quantity in all the seeds of wild plants. It is obvious, notwithstanding their absence from the soil, that the phosphates are formed in the organism of the plants, and that they originate from the phosphate of lime and magnesia and the supplied alkalies, by an exchange of the elements of both. The alkalies are necessary for forming *alkaline phosphates*, which cannot originate in the phosphate of lime alone. Both together are present in stable dung. In human excrements, and in guano, the alkaline carbonates are entirely wanting. The practice of the farmer, in some places, of supplying to the field not pure guano, but a mixture of it with gypsum, shows clearly that the phosphates of alkaline bases are really formed in the organism of the plants from the phosphate of lime and magnesia, because this mixture (guano and gypsum) contains less phosphate of potash or soda than the guano itself; or, in certain proportions of gypsum, no alkaline phosphates at all, the soluble phosphates in the guano decomposing the gypsum into phosphate of lime and magnesia, and into sulphate of potash. I am far from asserting that we should not provide the fields with alkaline phosphates. The excellent effect of the guano, and of the human excrements, is too well known to question it, and we perceive, from this fact, that plants are in this respect like domestic animals, which, with a normal food, are healthy and strong, but do not fatten. On the contrary, we know that if we prepare the food of these animals artificially, so as to render it more easily digested and assimilated, they are enabled to consume, in a given time, a greater quantity of it, by which all their parts increase in weight. The same happens with plants, if we give them their nourishment in a state most appropriated for assimilation; their capability to attract the other elements from the atmosphere increases, and their development is accelerated. If we recollect that the favorable effect of guano upon our fields depends on its amount of *ammoniacal salts*, of *alkaline phosphates*, and the *other mineral constituents* of the seeds, but that it is defective in *alkalies*, the principal elements of the *herbs*, *straw*, and *roots*, it is easily understood why the opinions of farmers on the value of guano as a manure are so very different. On a soil which is defective in alkalies its effect is small; on a soil rich in them it increases the produce in a remarkable degree; but, as I have already observed, the continued application of guano must gradually diminish the fertility of our fields for a number of plants, because the elements of those organs, of the leaves, stalks, roots, &c., without which the plants cannot be developed and cannot produce seeds, are taken off in the harvest without any restoration of them. I think it, therefore, certain, that the stable dung can replace to a certain degree, but not *vice versa*. A rational agriculturist, in using guano, cannot dispense with stable dung.

In the manufacture of an artificial manure, it must be kept in view that application of stable dung, of human excrements, and of guano, is attended with a great loss, in consequence of the too great solubility of their most efficacious elements; and this must be prevented by artificial means. This is evident, if we remember those countries from which guano is derived. It is known that the collection and preservation of the excrements on the African islands, and the coasts of Peru and Chili, depend upon the scarcity of rain in those countries. The best sorts of guano contain, in fact, more than one-half of their weight of soluble salts, which, if exposed

to the rain, are in exactly the same condition as, under similar conditions, a heap of *salt*. They dissolve in water, and are removed. Some months of rain would deprive those countries of all their riches. The remainder would have lost the greater part of its fertilizing power. Such effects, however, take place upon the guano with which our fields are manured. Only a small portion of its efficacious elements produce the beneficial effect they are capable of doing, the greater part being carried off by the rain. The stable dung is, in this respect, in the same condition as guano. Indeed, its principal elements are already in a dissolved state, and therefore are carried off more easily than those of guano.

A covering for those places in which stable dung is preserved, in order to shelter it from the effects of the rain, has been regarded in Germany as essential for preserving its manuring power. In consequence of the experience that the soluble elements of stable dung are the most efficacious, it has, in some cases, been drawn out with water, and it has been found advantageous to carry *only this fluid* to the fields. I need only refer to the foregoing analyses of the urine of animals in order to see upon *which elements* of it this effect depends.

The reason why, in certain years, the influence of the best and most plentiful manuring is scarcely perceptible, is, that during the moist and rainy springs and summers the *phosphates* and *other salts with alkaline bases*, as also the *soluble ammoniacal salts*, are entirely or partly removed. Art must find out the means of reducing the solubility of the manuring substances to a certain limit; in a word, of bringing them into the same state in which they exist in a most fertile, virgin soil, and in which they can be best assimilated by the plants.

I am occupied with a series of experiments, which lead me to hope that that this problem can and will be solved. If it succeed, as I have no doubt it will, in combining the efficacious elements of manure in such a way as that they will not be washed away, their efficacy will be doubled. If in this manner the injurious consequences of the present system of draining be removed, agriculture will be based upon as certain principles as well arranged manufactories. Manufactories of manure will be established, in which the farmer can obtain the most efficacious manure for all varieties of soils and plants. *Then*, no artificial manure will be sold whose exact amount of efficacious elements is not known; and this amount will be the scale for determining its value. Instead of the uncertainty of mere empiricism, all the operations of agriculture will be carried on with certainty; and instead of waiting the results of our labors with anxiety and doubt, our minds will be filled with patience and confidence.

I am, sir, your obedient servant,

DR. JUSTUS LIEBIG.

GIESSEN, 1845.

In Muspratt's English Patent for Improvements in the Manufacture of Manure, communicated by Dr. Liebig, of Giessen, Germany, the method proposed is thus described:

"In making manure according to the invention, I cause carbonate of soda or of potash, or both, to be fused in a reverberatory furnace, such as is used in the manufacture of soda-ash, with carbonate or phosphate of lime,

(and with such fused compounds I mix other ingredients, as hereafter mentioned,) so as to produce manures; and such composition, when cold, being ground into powder by edge stones or other convenient machinery, the same is to be applied to land as manure. And in order to apply such manure with precision, the analysis and weight of the previous crop ought to be known with exactness, so as to return the land the mineral elements in the weight and proportion in which they have been removed by the crop.

"Two compounds are first prepared, one or other of which is the basis of all manures, which I shall describe as the first and second preparations.

"The first preparation is formed by fusing together two or two and a half parts of carbonate of lime with one part of potash of commerce, (containing, on an average, sixty carbonate of potash, ten sulphate of potash, and ten chloride of potassium or common salt, in the hundred parts,) or with one part of carbonate of soda and potash, mixed in equal parts.

"The second preparation is formed by fusing together one part of phosphate of lime, one part potash of commerce, and one part of soda ash.

"Both preparations are ground to powder; other salts or ingredients, in the state of powder, are added to these preparations and mixed together, or those not of a volatile consistency may be added when the preparations are in a state of fusion, so that the manure may represent, as nearly as possible, the composition of the ashes of the preceding crop. This is assuming that the land is in a high state of cultivation; but if it be desired to grow a particular crop on land not in a high state of cultivation, then the manure would be applied in the first instance suitable for the coming crop, and then, in subsequent cases, the manure prepared according to the invention would, as herein described, be applied to restore to the land what has been taken therefrom by the preceding crop.

"*Preparation of manure for land which has had a wheat crop grown on and removed therefrom.*—Take of the first preparation six parts by weight, and of the second preparation one part, and mix with them two parts of gypsum, one part of calcined bones, silicate of potash, (containing six parts of silica,) and one part of phosphate of magnesia and ammonia.

"And such manure is also applicable to be used after growing barley, oats, and plants of a similar character.

"*Preparation of manure for land which has had a crop of beans grown thereon and removed therefrom.*—Take fourteen parts, by weight, of the first preparation, two parts of the second preparation, and mix them with one part of common salt, (chloride of sodium,) a quantity of silicate of potash, (containing two parts of silica,) two parts of gypsum, and one part of phosphate of magnesia and ammonia.

"And such manure is also applicable for land on which peas or other plants of a similar character have been grown and removed.

"*Preparation of manure for land on which turnips have been grown and removed therefrom.*—Take twelve parts, by weight, of the first preparation, one part of the second preparation, one part of gypsum, and one part of phosphate of magnesia and ammonia.

"And such manure is also applicable for land where potatoes or similar plants have been grown and removed."

He remarks that other manures may be prepared for plants, "if the matters of which the plants are composed, and the quantities, are first ascertained, by burning the plants and analyzing the ashes, and then combining

the manure according to the analysis. The manure so made is to be applied to the land in quantities as great or greater than the quantities of the elements which have been removed by the previous crop. It should be stated, that where the straw of wheat and other similar plants which require much silicate of potash is returned to the land as manure, that is considered to be the best means of restoring the requisite silicate of potash to the land; in which case the silicate of potash would be omitted."

Communicated for the New York Farmer and Mechanic, for publication.

AMERICAN INSTITUTE—FARMERS' CLUB.

Source of carbon and nitrogen in plants, as derived from the soil: by Fromborg, of the Agricultural Chemistry Association of Scotland.

The opinions of Mulder, of Utrecht, founded on great chemical investigation, are, that the organic constituents of soil—namely, the humic, ulmic, geic, crenic, and apocrenic acids—after being combined with ammonia, are taken up and assimilated by plants, being all of them very soluble in water, and possessing polybasic properties, by which they are enabled to form combinations with potash or soda, ammonia, lime, magnesia, and oxide of iron, in which several of those bases are present at the same time;

That ammonia is formed in the soil by the combination of the nitrogen of the air with hydrogen in its nascent state, as liberated during the decay of vegetable and animal substances in the soil.

From careful experiments, Mulder establishes the following facts:

1. Rain-water and air are insufficient to suport the life of plants.
2. Rain-water, wood-ashes, and air, are equally so.
3. That the aqueous extract of humus contains too small a portion of matter to afford plants all they require.
4. That ulmic acid from sugar is advantageous to their growth.
5. That humic acid from garden mould is very useful in vegetation.
6. That humate of ammonia from peat is advantageous to the growth of plants.
7. That charcoal and ashes are inferior to arable soil, or to the substances mentioned in Nos. 5 and 6.

Fromborg says the well known fertilizing action of charcoal requires, indeed, no other explanation than its characteristic property of condensing gases.

Mulder observes that a number of little plants were produced in solutions of potato starch, acetate of potash, nitrate of ditto, binoxolate of ditto, and even in chloride of calcium, sulphate of soda, and common alum. I have seen them in solutions of neutral tartrate of potash and of sulphate of alumina.

Miguel, of Rotterdam, the skilful botanist, examined these plants and recognised them as being of the genus cryptococeous, ulvina, hydrococis, sirocrocis, and Septomitus.

Professor Liebig says that traces of ammonia can hardly be detected in large quantities of rain-water; and although he assumes that a pound of rain-water contains one-fourth of a grain of ammonia, yet it is obvious that, in a continuous rain, only that part which falls first contains that

quantity! What falls subsequently would soon be without ammonia at all. The minute quantity contained in the air, above a field, is far from being a sufficient source for all the nitrogen contained in the plants growing upon it.

Professor Johnston says: The ammonia produced in the air from decomposed vegetables and animals can but imperfectly be restored to the soil. The greater part is washed down by rains into the sea, and is lost to the soil. What remains in the air will undergo a continual decomposition by electricity and by thunder storms.

Mulder's theory is, that the ammonia in the soil serves as a medium to transfer the oxygen of the air to putrefying substances.

Many think that the doctrine of aerial nutrition of plants is right, because it exhibits a degree of simplicity and beauty consonant with the other works. [Read by H. Meigs.]

The result of a trial of various manures, reported in the Royal Agricultural Society's Journal, led to the following conclusions:

1. Nitrate of soda, nitrate of potash and soot, have a tendency to increase the produce of wheat, both straw and grain.

2. That common salt has a slight tendency to increase the produce of grain, and to decrease the weight of straw—(mark the *weight* of straw, that it does not diminish the bulk;) and that common salt increases the weight per bushel of the grain. Thence it may, from these properties, be advantageously used as an auxiliary to the other manures.

3. That sulphate of soda has no visible effects upon the wheat crop. The slight variation in yield of straw may be fairly attributed to accidental circumstances, such as variation of soil, &c., as no two patches can be *perfectly* equal in every respect.

[At a meeting of the American Agricultural Association.]

PREPARED MANURES, AND THEIR EFFECT UPON CROPS.

BY MR. PELL.

* * * * * * * * * *

I apply straw to the cattle-yard; it absorbs the liquid excrement, and rots. What is long or partly unrotted I apply to hoed crops; what is fine I mix with the eleven requisites, and apply as a top-dressing. It may be advisable to apply the straw to the ground, and plough it when unrotted. To grow grains, give the soil straw of its kind; for potatoes, their vines; grapes, their vines; to apples, their branches; and so of all. The droppings of cattle are the best material to grow grasses, as they feed on grass; those of horses fed on grain, for the growth of cereals. Onions are grown year after year by only returning the tops to the ground. In Virginia, had the refuse of the tobacco plant been returned to the soil, she would not now be barren. The bad farmer is injured by the vicinity of well manured land, as manure has an affinity for oxygen, hydrogen, ammonia, &c., floating in the air, and attracts them to the provident farmer's land.

Formerly, I applied composts of various things, and had wonderful results; I dared not omit any one, as I knew not which had produced the

result. Now, science, by analysis, shows what is necessary. By these composts, I grew a squash to weigh 201 pounds, the heaviest on record; and a cabbage to weigh 44 pounds. By it I grew wheat to weigh 64 pounds, rye 60 pounds, oats 44½ pounds. When Sprengle made known his analysis, showing that eleven substances are necessary to all good soils, I found that my compost, by chance, had them all, and twenty other enriching ingredients.

Previous to 1840, my orchards bore only every other year. Since then, I make them bear every year; and this year, a bad one for fruit, found my manured trees full, and those not manured barren. The drought of this year was fatal to fruit; yet my manured trees had abundant moisture, and were fruitful. I prefer the manure of decayed vegetable matter to the excrement of cattle, as the material that makes and supports the animal has been extracted, and the excrement is not so rich on that account. If the vegetable matter be rotted and its ammonia fixed by charcoal dust, all the chemical substances are present. Thus, rotted vegetable matter is more beneficial than the dung of cattle, quantity and quantity alike.

A most valuable manure is the liquid remaining after the boiling of bones. It is very offensive unless disinfected. When hot it is not offensive, but becomes so when cold. It is a jelly when cold. By the application of charcoal dust to the hot liquid, the jelly, when cold, is not offensive. In this state it may be made into compost with other substances. In that condition it is a most valuable manure. At present large amounts of the liquid are thrown into the rivers. I prevailed upon a grinder of bones to save his liquid by charcoal, and he now sells what formerly he hired carried away. I have used it with great advantage, both on arable and meadow land.

Charcoal is one of the most valuable manures. It is the most powerful absorbent known. It takes from the atmosphere oxygen, hydrogen, nitrogen, ammonia, &c., and holds them while the weather is dry. During rain it absorbs eighty per cent. of water, and releases the gases to descend to the earth to fertilize it. When the weather becomes dry it parts with the water, and absorbs from the air the gases again. This it continues almost perpetually, as it is nearly indestructible. When applied to the earth, the trees, plants, and grasses are found to have it adhering to their roots, ready to impart gases and moisture as wanted. Trees packed in it have remained green for eighty days, while others, without it, have died in like circumstances. Hams and salt meats are preserved perfectly when packed in it. I preserved apples in perfect condition for one year in it. If spread over compost heaps, barn yards, stable-floors, in privies, it absorbs the ammonia, prevents offensive smells, fixes the volatile gases, and thus makes a valuable compost.

Ashes applied to sandy soils are valuable; and, on some soils, leeched are as good as unleached. I have known land, too poor to grow eight bushels of corn, made to produce forty-five bushels by ashes alone; and they are more valuable on a sandy soil than any other, except marly clay. They enable the sandy soil to retain its moisture—a great point. They are used to great advantage on Long Island and in New Jersey. They stimulate growth, as does plaster. Sown broadcast on grass, the effect is perceptible at a great distance. The yield the first year, on sandy soils in grass, will pay the expense of applying forty bushels to the acre. They give to the soil silicate of potash, which is needed to form stems.

Ashes have two actions on soils, viz: Chemically, by alkali they neutralize acids; and mechanically, by rendering sandy soils more tenacious. Muck is made valuable by them, when mixed in compost; the acid of the muck is destroyed by the alkali, and fermentation follows.

Lime has been used by me to great advantage. I prefer oyster shell lime, as it contains no magnesia, which most stone-lime does. I think oyster-shell lime has a tendency to lessen in growth the stem and leaves, and increase the fruit and seeds. I put on barren or worn-out land 300 bushels of oyster-shell lime, and it grew wheat to a weight of 64 pounds per bushel: with the wheat I sowed one bushel of clover seed and half a bushel of timothy seed per acre, and the next year cut 2½ tons, and the second year 3 tons of hay per acre. I have found it of great advantage in potato culture; the potatoes do not rot in the ground, while neighboring unlimed ones *all* do. They are mealy and fine, and do not rot after gathering, and have been free of rot in dry, wet, and average seasons. I think it destroys the fungus or insect, if either be the cause of rot.

Bone dust I have used, and find it most valuable, and advise its use, especially on soils long cultivated, destitute of phosphate of lime. It is the most efficacious manure that can be used on an exhausted soil, but will do better on dry calcareous soil than on such as contain alumina. It should be mixed with earth to ferment before spreading. There should be used from twelve to twenty bushels to the acre. It seems best on turnips In compost it is valuable, as it yields phosphates largely. It is said that in England, where, on lands, it had been applied twenty years before, its effect could be seen to a yard I trust the exportation of bones from our country will soon cease.

I have used guano successfully and unsuccessfully. Mixed with earth, and applied to plants in close contact, it was injurious; applied in weak solution to grass land and green-house plants, its effect was wonderful. My experience shows that *its method* of use will determine *its value*. In composts I have found it very effective.

Night soil is one of the most valuable manures. In this country, as well as in England, great prejudice prevails against its use in agriculture or gardening. For ages it has been used in Asia, and particularly in China. In France, in Belgium, Bohemia, Saxony, all the German confederacy, and Sweden, its destruction or waste is prohibited by law. In England and America it is thrown into the rivers, to befoul them, and the fish which devour it are eaten instead of vegetables grown by it. As manure, six loads of it have been found to produce 650 bushels per acre of potatoes, while, on the same ground, one hundred and twenty loads of horse manure yielded only 480 bushels.

In conclusion, I have to remark that the main stay of the farmer is his barn-yard manure. Yet this varies in quality, according to the material of which it is made, and the manner of making. Thus the droppings of cattle fed on straw and turnips are far less valuable than those of cattle fed on hay and oil-cake; and it is economy to feed hay and oil-cake rather than straw and turnips. So in manuring: that which is leached by rains and volatilized by the sun is less valuable than the unleached and unsunned.

PREPARATION OF MANURE

In the review of a work of Mr. Bernay's, chemist, on the subject of manures, &c., the Mark Lane Express quotes the following method of preparing the farm-yard heap:

"The importance and advantages of the arrangement and compilation of the manure heap are too well known to require any observation from us; but we cannot lay by this practical work without giving the author's directions for preparing the farm-yard heap.

"'It should be a rule to heap it on as small a space and as compact as possible. The ground on which it is placed should consist of a stiff clay, or be bricked over. It should commence about half a foot below the surrounding ground, and be situated so as to cause all the water from the manure to run into the tank. The conduit leading to the latter should be well covered in, so as not to allow spring-water or rain-water to collect in it. A layer of gypsum is now to be spread on the flooring, and the heap is to be commenced by covering the whole bottom, with the exception of about half a foot on each side. On every foot height of manure a layer of gypsum is to be spread, sufficiently thick to appear white. When the heap is completed, or before, the contents of the tanks are to be poured on by degrees, in quantity sufficient to moisten the head well, but so that little will run back into the tanks. By these means the following advantages will be obtained: Firstly, the cartage of the urine will be rendered unnecessary, and some labor and expense saved; secondly, the gypsum of the farm-yard heap will be dissolved; and, thirdly, by the addition and evaporation of the water of the urine, the decay of the manure will be hastened. If the method recommended of strewing the stable floorings with gypsum be followed out, of course but a small quantity of it will be necessary. A thin layer may then be strewn on every two feet high of the heap; and when completed, the top and sides should be sprinkled with it. The heap itself should not be higher than six feet, for many reasons.'"

From the New England Farmer.

DISSOLVING BONES IN SULPHURIC ACID.

At a special meeting of the Royal Agricultural Society of England, Mr. Pusey, having adverted to the great discovery of the economical and efficient employment of bones as manure, when dissolved by maceration in sulphuric acid, proceeded to read extracts from Mr. Hannam's prize essay on the subject, of which the following is a condensed statement:

In an experiment on turnips, the crop from dissolved bones was not only more abundant, but less attacked by insects than that dressed with undissolved bones, and the plants far more rapid in their growth the first month, and a gain of a month in the end. The results of several experiments by Mr. Hannam were then stated, from which it appeared that 2 bushels of dissolved bones produced as good results as 16 bushels of undissolved; that 8 bushels dissolved would greatly surpass 16 bushels not dissolved; and that 4 bushels in a state of solution would be a proper quantity per acre, producing crops greatly superior to 16 bushels of undissolved crushed bones, and the cost less in proportion to the effect produced. [We suspect the effect on the *first* crop only is here referred to.]

The proportions used had generally been, of acid one-half the weight of the bones, but one-third or even one-fourth of the bones might be employed: the proportion of water had generally been 100 times the weight of the acid, but 50 or 25 times would serve the purpose efficiently. It must be understood that the more finely pulverized the bones are before mixing, the better.

Mr. Thompson stated that he had last year found 4 bushels of dissolved bones, applied in the form of compost, fully equal to 20 loads of farm-yard manure, there being no perceptible difference in the crop throughout the field. Mr. T. suggested, that as it was often difficult for a small farmer to find a vessel of sufficient capacity to contain the mixture, it might be found a simple substitute to form a sort of pond, puddled with clay, in which the mixture could be made. When the solution was complete, the clay might be mixed with the compost.

A letter from Mr. Spooner, of Southampton, was read, in which he stated that he had last year used bones and sulphuric acid in compost, for turnips. He had prepared it by placing 1¾ bushel of finely ground bones in a tub, with half their weight of acid, diluted with four times the quantity of cold water. After some hours, a few bushels of fine mould and some coal ashes were added, so as to make the whole amount to 15 bushels of compost. The mixture was applied in the drills at the rate of little more than 2 bushels per acre, and, as Mr. Spooner states, successfully rivalled 16 bushels of bones applied to an acre of superior quality.

There seems to be some difference of opinion as to what constitutes the fertilizing principle of bones. Professor Liebig, in the third edition of his Agricultural Chemistry, says: "The efficiency of bones as a manure does not depend upon the nitrogenized (organic) matter, as has been generally but erroneously supposed, but upon their phosphate of lime." Professor Johnston, and many others, attach much to the gelatine, which slowly decomposes and affords to plants nitrogen. The gelatine or organic part of bones is, chemically, like horn, hair, wool, and skin; and as these substances are all known to be good manures, the gelatine of bones must operate in the same way.

The oil or fat in fresh bones, if applied to the soil without any preparation, I think cannot be of much use, as it consists entirely of carbon, and the elements of water—oxygen and hydrogen. When buried in the soil, it is almost as indestructible as charcoal. If muscle, lean meat, and animal fat, are mixed in a heap, and exposed to the action of the weather, even in the hottest part of summer, the muscle (lean meat) is soon decomposed, but the fat will run together and be converted into a substance resembling old cheese or spermaceti: the fat in bones will probably do the same.

There are several ways in which a farmer may make use of bones for manure, in the country, where there are no mills to grind them. He can break them up, and apply them to the soil in the broken state; they will in that way gradually give out nitrogen and phosphate of lime for at least "three lives."

They can be burnt, and then they are easily broken up, and can be dissolved in sulphuric acid; the fire, however, drives off all the animal matter. Or they can be boiled in strong lye, and in a few hours they become disintegrated, and as fine as meal. By this process the nitrogenized part, the gelatine, is mostly driven off, and the air of a room in which they are boiling smells as strong of ammonia as the hold of a guano ship; but the

oil and fat are converted into a kind of soap. The whole can be mixed with muck or soil, and will make a first-rate manure for the turnip crop.

I have boiled some bushels of horn-piths into a pulp, in three hours; the harder bones require some longer time. Without doubt, if there was a portion of sulphuric acid mixed with the lye, the bones would come to pieces much sooner, and the ammonia would probably be fixed by the acid, and formed into sulphate of ammonia; unless it should combine with the potash of the lye, or the lime of the bone, as it has a stronger affinity for these.

As stated near the commencement of this, rather more than one-half of dry bone is phosphate of lime—in the proportion of 51½ per cent. of lime, and 48½ of phosphoric acid. By mixing about one-half the weight of sulphuric acid diluted with water, double decomposition ensues—one-half the lime of the bone combines with the sulphuric acid, and forms gypsum. The other part of the lime combines with a double equivalent of phosphoric acid, and super or biphosphate of lime is the result. Phosphate of lime is very insoluble; biphosphate is much more soluble, and is readily taken up by the rootlets of plants, especially by the wheat crop. About one half the ashes of the grain of wheat is phosphate of lime. Phosphate of lime and potash are found in the ashes of all our forest trees, but it is so very insoluble that it is not extracted in the process of leaching for soap making; and, unquestionably, much of the value of spent ashes depends upon the phosphates they contain.

L. B.

[Messrs. Stabler's, Hallowell's, and Norton's experiments, &c., on manures, Mr. Pickett's account of guano, and the description of its poisonous effects, are omitted for want of room.]

APPENDIX No. 31.

CANADA TARIFF.—CANADIAN CUSTOMS.

These duties are to be counted as sterling money, and to take effect on the 6th day of April next. (1845.) These duties are *in addition* to the duties imposed on the same goods by the British Parliament. This act repeals all former duties except that on wheat.

Animals, viz: Cows and heifers, each £1; calves, each 5*s.;* goats, each 2*s.* 6*d.;* horses, mares, geldings, colts, fillies, foals, each 10*s.;* kids, each 2*s.* 6*d.;* lambs, each 1*s.;* oxen and bulls, and steers, each £1 10*s.;* pigs, (sucking) each 6*d;* swine and hogs, each 5*s.;* sheep, each 2*s.*

Grain, viz: Barley, the quarter, 3*s.;* buckwheat, bear, bigg, the quarter, 3*s.;* oats, the quarter, 2*s.;* maize or Indian corn, (the quarter to be 480 lbs.) the quarter, 3*s.;* rye, beans, peas, the quarter, 3*s.;* meal of all the above grains, and of wheat not bolted, the 196 lbs., 2*s.;* wheat flour, per bbl. of 196 lbs., 6*d.;* bran or shorts, the cwt., 3*d.*

Hay, the ton, 6*s.*

Straw, the ton, 3*s.*

Provisions, viz: Butter, the cwt., 2*s.;* bacon, the cwt., 5*s.;* cheese, the cwt., 2*s.* 6*d.;* hams, the cwt., 5*s;* meats, salted or cured, the cwt., 2*s.;* meats, fresh, of all kinds, the cwt., 4*s.*

Candles: Sperm or wax, the lb., 2*d.;* all other kinds, when imported otherwise than by sea, the lb., 1*d.*, and if imported by sea, five per centum ad valorem.

Potatoes, the bushel, 3*d.*

Salt: Imported otherwise than by sea, the barrel, weighing net 280 lbs., 2*s.* 6*d.;* imported by sea, the ton, 1*s.*

Tobacco: Unmanufactured, the lb., 1*d.;* manufactured, the lb., 1*d.;* cigars, the lb., 2*s.;* snuff, the lb., 4*d.*

Wood, viz: Pine, *white*, and in proportion for any smaller quantity thereof, per 1000 cubic feet, £1 5*s.; red*, per 1000 cubic feet, £1 15*s.;* oak, per 1000 cubic feet, £2 15*s.;* birch, per 1000 cubic feet, £2 10*s.;* ash, elm, tamarac or hacmatac, and other woods not herein charged with duty, per 1000 cubic feet, £1 5*s.;* staves, standard or measurement, per standard mille, £1 5*s.;* puncheon, or West India, white oak, per standard mille, 10*s.;* ditto red oak, per standard mille, 7*s.* 6*d.;* do. ash, per standard mille, 4*s.;* do. barrel, per standard mille, 4*s.;* deals, pine, per Quebec standard hundred, 15*s.;* do. spruce, per do., 7*s.* 6*d.;* plank, boards, and all kinds of sawed lumber not herein charged with duty, per 1000 superficial feet, inch thick, 7*s.* 6*d.;* and so in proportion for any greater thickness.

Ashes of all kinds, bark, burr stones unwrought, berries, nuts and vegetables used principally in dyeing, cotton-wool, coals, fur skins or peltries, undressed or unmanufactured, hemp, flax and tow, hides, (raw,) pig iron, saw logs, soda ash, tallow, lard, fish-oil, fish, salted or cured, oysters, lobsters, and turtles, for every £100 of the value, £1.

A table of imperial duties on imports into Canada; compiled conformably with the revenue laws now in force.

Beef, fresh, free.
Beef, salted, 3*s.* per cwt.

Bacon 3*s*. per cwt.
Bran or shorts, free.
Butter, 8*s*. per cwt.
Candles, spermaceti, 15 per cent.
  Do. all others, 7 per cent.
Cheese, 5*s*. per cwt.
Eggs, 4 per cent.
Fins and skins of sea animals, 15 per cent.
Fish, fresh, free.
Fish, dried or salted, 2*s*. per cwt.
Fish, pickled, 4*s*. per barrel.
Flax, free.
Flour of wheat, 2*s*. per barrel.
Flour and meal, other, free.
Fruits, fresh, free.
Hams, cured, 3*s*. per cwt.
  Do. fresh, free.
Hay, free.
Hemp, free.
Hides, raw, free.
Hops, 4 per cent.
Live stock, asses and mules, free.
Bulls, free.
Calves, under 1 year, free.
Cows, and all cattle under 4 years, free.
Goats, free.
Hogs, free.
Horses, free.
Colts, under two years old, free.
Lambs, free.
Cows and oxen, four years old and upwards, free.
Sheep, free.
Lumber, free.
Manures, of all kinds, free.
Meal, free.
Meat, fresh, free.
  Do. salted, 3*s*. per cwt.
Pork, fresh, free.
  Do. salted, 3*s*. per cwt.
Potatoes, free.
Poultry and game, 4 per cent.
Oats, free.
Seeds, 4 per cent.
Seeds, garden, free.
Straw, free.
Soap, 7 per cent.
Tallow, free.
Tobacco, manufactured, 7 per cent.
  Do. unmanufactured, 4 per cent.
Vegetables, fresh, free.
Wood and lumber, free.

APPENDIX No. 32.

TRADE, ETC.

From the Mark Lane Express.

THE CORN CROPS OF EUROPE.

We extract from the *Gazette d'Augsburg* the following article on the crops of 1845 in Europe :

" According to the custom we have adopted, we shall divide our account of the results of the last crop into two parts—one referring to the east, and the other to the west of Europe. For several years past the east threatened us with sterility. It first of all began in Russia, spread over Poland and Prussia, and appeared even this year likely to diffuse itself in the east of Germany. Experience has generally proved that in the boreal latitude the rainy years are more sterile than the dry ones. This fact has again been confirmed during the last years. It was humidity that diminished the crops a few years ago in Russia, and which produced the like effect in Poland, Galicia, and Upper Silesia, in the course of last year. In Germany the humidity has not produced any unfavorable consequences, but in certain countries. There are others, on the contrary, which have suffered from want of rain. The results of the crops are, in the mean time, far from being satisfactory, and, from the calculations which have been made, will not suffice the public consumption.

" It is far from our intention to represent the situation of things in more dreary colors than belong to it ; but we do not wish, and we ought not, to exaggerate the advantages of it, desirous as we are of attaining our present object, which is to furnish an exact appreciation of actual circumstances. We shall separately name the different countries, and indicate the supplies they stand in need or can dispose of.

" Russia will have sufficient corn for the whole empire, without purchasing any foreign corn. Its governments are in a position to assist mutually each other, but it is very doubtful whether they can send much corn abroad.

" The crops of Poland are not sufficient for its general consumption ; and, unless it has been previously supplied, will suffer from a scarcity, or be obliged to receive corn from abroad. But whom can one have recourse to when one's neighbors have only had themselves but middling crops, and have not wherewith to supply the deficiency ? Money also is scarce in Poland, and important sums cannot be sent abroad to purchase corn.

" The kingdom of Prussia has greatly suffered last year and this from inundations, which have ravaged precisely its most fertile countries ; and want, which is generally felt there, is on the point of transforming itself into actual famine.

" The news from Pomerania agrees in stating that the results of the last crops are very mediocre.

" In the Grand Dutchy of Posen only a middling crop has been obtained, and anterior provisions can alone prevent a scarcity. The author does not remember having heard such numerous and general complaints, unless it be in the years 1804 and 1817. God grant that the unfortunate events of

that epoch be not again reproduced! There are in this province whole countries where the usual corn sellers will be obliged themselves to make purchases the next spring. The situation of Galicia is still worse. The price of rye rose 60 per cent. immediately after the crops. It is still on the rise.

"In Hungary, which is usually so productive, the government has been obliged to lay in large stores of corn to prevent a famine. The hope entertained of having good crops has been still more cruelly disappointed than in Silesia.

"In Austria, Moravia, and Bohemia, the results of this year's crop are below those of the average ones, and must scarcely suffice for the general consumption.

"If we consider the west of Germany, we find, first of all, that the crops in Saxony have not precisely failed, although they are very far from being abundant. The same may be said of the provinces of Brandenburg and of Magdeburg.

"Bavaria, like other countries, has suffered greatly this year from hail-storms and water-spouts. The results of the crops have, in consequence, been diminished, as likewise by the state of the atmosphere, which has shown itself but little favorable to the cultivation of corn.

"Wurtemburg, the country of Baden, Westphalia, and the Rhenish provinces, have been better treated; but the disease which has ravaged the potato crop will be severely felt. Nevertheless, the potato crop has been generally good throughout western Germany. It will supply many deficiencies in the crops of other places, although they are not so much grown as in other parts of Germany.

"Belgium and Holland have had but bad crops; and the news from France sufficiently proves that this year has not been a productive one.

"Spain occupies but an inferior rank among corn-growing countries; still, reports from this country do not mention that the crops have been deficient.

"England, where the States of the European continent generally find a market for their surplus corn, appears to-day to be reassured on the wants of its internal consumption, or at least the alarming news which arrived from that country has been succeeded by much more favorable intelligence. Those who count upon corn supplies from the Baltic and provinces of the North Sea will be greatly deceived. The prices of these productions will first of all be very high; and, in the second place, the quantities that can be supplied, very small. A great quantity of wheat has this year been struck by blight; and this disease, which has spread throughout Germany, Poland, and Hungary, has deteriorated the quality of the corn, as well as diminished the quantity. Further, it cannot now be accurately known whether at a later period England will not be reduced to supply itself from abroad, for it is well known that it is only in case of an abundant crop that enough corn can be grown for the country. In the contrary case, she will look to supplies from America, or from the countries bordering on the Black Sea.

"In Scandinavia, that is to say, Denmark, Norway, and Sweden, the crops have not been satisfactory. In a few words, then, it may be said that for many years past there has not been so unfavorable a year as the present one; and if it be added that last year only furnished but indifferent crops in comparison with the preceding ones, this circumstance ought to give rise to measures being taken to prevent the danger which threatens us."

CURED PROVISIONS, AND CATTLE.

A return of cured provisions imported in the half-year, to the 5th of July, 1845, and of live cattle imported in the last three years, has been printed by order of the House of Commons, on the motion of Mr. Grogan, M. P. for Dublin city. It hence appears that the total quantity of cured provisions imported into the United Kingdom in the period above mentioned, was: Of salted beef, 46,347 cwt.; of salted pork, 23,860 cwt.; of hams of all kinds, 2,423 cwt.; and of bacon, 16 cwt. only. A very insignificant portion of these cured provisions was retained for home consumption, namely: 2,363 cwt. of beef, realizing a revenue (in the shape of duty) amounting to 401*l.*; 1,191 cwt. of salt pork, producing a revenue of 459*l.*; 1,349 cwt. of ham, producing a duty of 992*l.*; and 13 cwt. of bacon, yielding an amount of duty of 20*l.* The total quantities re-exported as merchandise was: Of beef, 4,304 cwt.; of pork, 6,341 cwt.; and of ham, 470 cwt. The rest was taken for ships' stores, including 44,672 cwt. of salt beef, (junk,) 12,563 cwt. of salt pork, and 525 cwt. of ham. The greater portion of the salted beef was imported from the Cape of Good Hope, and the Hanseatic towns figure for 2,650 cwt. The larger portion of the salted pork came from the Cape of Good Hope, the Hanse Towns, and Prussia, and half of the ham from the Hanseatic towns, the rest being distributed for the most part between Hanover, Oldenburgh, Holland, and the Peninsula, (including both Portugal and Spain.) Of live cattle and other animals there were imported into the United Kingdom in the year ended July 5, 1845, 6,466 oxen and bulls, 2,503 cows, 118 calves, 3,969 sheep, 42 lambs, and 411 swine and hogs. In 1843–'44 there were imported 1,294 oxen and bulls, 531 cows, 60 calves, 220 sheep, 12 lambs, and 322 swine and hogs. In 1842–'43 there were imported 3,578 oxen and bulls, 1,193 cows, 86 calves, 727 sheep, 12 lambs, and 563 swine and hogs. From which figures it results that the importation of oxen and bulls has nearly doubled since the year 1842–'43, that the import of cows has more than doubled itself during the same period, that sheep have increased from 729 to 3,969, that calves have remained steady, and that, lastly, swine and hogs have fallen off. Such are the effects of the new tariff, as illustrated by the return before us.

From the American Agriculturist.

STAVES.

Since the late reduction of duty in Great Britain on staves from the United States to 28*s*. per 50 cubic feet, they will become an article of considerable export. It is important, therefore, that they should be properly prepared for the English market. For the benefit of those farmers engaged in the stave business, we subjoin, from a circular recently received here, the principal directions to fit them for the British market.

Size.—The standard to which staves are now limited is 72 inches long, 7 inches broad, and 3 inches thick, and it is always very desirable to get the staves of this full length and breadth, length especially. By making them 72 inches long, they suit at once for the sides and ends of all puncheons for the West India trade, and also for the sides of sugar hogsheads. For brewers' casks, both for the home and export trade, there is a large de-

mand for white-oak staves, 30, 37, and 47 inches long, 7 inches broad, and $1\frac{1}{4}$, $2\frac{1}{4}$, and 3 inches thick. The present standard thickness of Canada pipe staves, viz: $1\frac{1}{2}$ inch, is very suitable for coopers in general; but 1 inch, 2 inches, $2\frac{1}{2}$ inches, and 3 inches, are all used, although the thick sizes are considered less valuable, and scantlings with large proportions of those in them do not take the market so well. Besides the full length of 72 inches, the only other sizes at which staves should be cut are 42 inches and 33 inches. These lengths would answer the home cooper trade generally, and suit exactly for West India casks, &c. The lengths of 30 inches to 33 inches are also the sizes required for beef tierces; and if split at the proper thickness of an inch, or rather less, or if they were of such thickness as would split into an inch, large quantities of them might be disposed of. These are what have hitherto been called pipe staves. As regards small staves, the only length it would be worth sending is that of 42 inches. Of these there are three kinds which require to be specified: 1st, rum puncheon; 2d, molasses puncheon; 3d, sugar hogshead. Rum puncheon and molasses puncheon staves are cut 42 inches long, and should stand at least 1 inch thick in the rough state. A similar stave, for spirit casks, &c., 45 inches long, and $1\frac{1}{4}$ thick, would generally find a ready sale. Some hogshead staves are 42 inches in length and three-quarters of an inch thick. Particular attention should be paid to make them stand about an inch more than the lengths stated, to allow for working them to the net size.

From the Southwestern Farmer.

TRADE IN CORN-MEAL.

We see no reason why corn-meal should not be a great article of export from this region of the Union to the West Indies, South America, and even England, (or, rather, we should say *especially* to England,) for in that country corn cannot be raised. There are establishments in some parts of the country for preparing it by kiln drying, in such a way that it can be kept sweet in tropical climates for many months. In Mississippi we have now corn in silk, (May 15th,) at a date when those who export to the West Indies have not planted theirs. If, then, we had the same enterprise among our people that our brother farmers have in Illinois, Indiana, &c., we might have our mills, coopering shops, and packing-machines, as well as the corn-grower, all busily employed furnishing the foreign market with "*fresh corn-meal*" before the Illinois corn is in tassel.

In connexion with this subject, we call attention to the following communication, copied from the New Orleans Bulletin. It is from the pen of a Norseman. N.

CONSUMPTION OF CORN-MEAL IN THE WEST INDIA ISLANDS.

The consumption of corn-meal and other American produce throughout the British West India islands, since the emancipation of their slaves, has considerably increased. The negro, formerly limited by law to a certain quality and quantity of food, has now his choice of both, as far as his means,

obtained by labor, will admit; hence the consumption of pork, beef, butter, lard, cheese, flour, bread, etc., etc., formerly luxuries, are now in general use, and increasing to an immense extent, while the consumption of corn-meal, the only food during slavery, is again reviving, and its use on the increase, from the following causes.

In the Antilles, Jamaica, Barbadoes, and Trinidad excepted, the lands are too valuable, "under a protective system, and at the low price of life's necessities in the United States," to produce corn, yams, casadas, or other substitutes for bread; besides which, the operations of growing and manufacturing sugar cannot be accomplished without combined labor; hence the laborer, allured by the magic of money, which he can readily obtain for his labor, neglects even the small patch of ground on which, as a bondsman, he was entirely dependant for a few pennies to purchase a bit of pork or white bread—"then luxuries."

Barbadoes consumes now from 20,000 to 25,000 barrels of corn-meal annually; whereas, previous to the emancipation, not a barrel was imported. In this fact may be found the basis for my previous argument. Anterior to the emancipation of slavery, a great many small farmers, called ten-acre holders, existed by raising corn and ground provisions for the use of the planter to feed the slaves; so abundant at times were their crops, that I have known corn to be shipped from Barbadoes to St. Thomas. The natural decrease in labor, since the emancipation, by the same number of hands, has, in order at all to approximate former crops, caused an increased demand for laborers, which has drawn this class of agriculturists from their former occupations, finding it more to their advantage to render services for ready money, supplying their wants in market. I do not for a moment pretend to say that Barbadoes is altogether dependant on foreign imports of corn-meal: 25,000 barrels per annum are but a small portion of sustenance for a laboring population numbering at present 85,000 souls; but I feel fully assured the same causes which have created the present demand are on the increase. Trinidad has increased her population much since the emancipation of slavery. It has, however, as yet, for its extent of country and fertility of soil, a small population, raising within themselves a good deal of corn, and receiving some supplies from South America. The consumption can at present only be computed at 10,000 barrels, while that of Demarara is about 15,000.

Jamaica, with a laboring population of about 325,000 souls, consumes comparatively less than the former-mentioned islands: 30,000 barrels may at present be considered the extent. Large tracts of lands have, since the emancipation, become divided among the laboring classes, producing large quantities of substitutes for cheap breadstuffs. This circumstance, combined with the almost spontaneous growth of fruit and vegetables, makes the laboring classes at certain seasons less dependant on foreign supplies; but as the population is and must continue on the increase, so follows an increase of wants. St. Croix, St. Thomas, and St. John's are permanent, being fixed by law to seven quarters of meal for each laborer; which amounts, at St. Croix, according to a statement furnished me by the Royal Danish Chamber of Commerce at Copenhagen, to 9,500 puncheons, or equal to 38,000 barrels. St. Thomas and St. John's consume about 6,000 barrels. St. Croix consumes but few other American provisions except flour, of which about 4,000 barrels of American; the balance of her consumption, about 3,000 barrels of flour, large quantities of beef, pork, etc., are supplied

by the mother country—Denmark. Yet that island, only 100 square miles, with a population of 34,000, employs yearly about 10,170 tons American shipping. For the general trade of the West Indies, meal in barrels is found most saleable. St. Croix and Porto Rico, however, require their supplies in puncheons, of 800 lbs. net, (such as shipped from Brandywine mills,) both on account of its better keeping, and use for the puncheons for rum and molasses.

From the foregoing illustrations, I will now venture upon a general computation of the consumption of corn-meal throughout the West Indies. Antigua, Dominica, Granada, Montserrat, Nevis, St. Kitts, St. Lucy, St. Vincent, Tobago, Guadaloupe, Martinique, the Virgins, and Bahamas, with a population of 184,000 souls, must, in common calculation, consume

Annually about 200,000 barrels, say - - -	200,000 bbls.
Barbadoes, 25,000; Trinidad, 10,000 - - -	35,000 "
Demarara - - - - - - -	15,000 "
St. Thomas, St. Croix, and St. John's - - -	44,000 "
Porto Rico, 40,000; Jamaica, 30,000 - - -	70,000 "

making 364,000 bbls. corn-meal annually. A branch of trade so easily at our command has hitherto been neglected, or but partially and imperfectly commenced; whereas, with this article, the supplying of every other article of provisions from our port would follow. That such a trade is important to New Orleans, I will illustrate by a statement of the imports into Kingston, Jamaica, for three years, up to the 19th of this month, the day I left Kingston:

	1843.	1844.	April 19, '45.
Flour, bbls. - - - -	65,464	98,900	25,700
Flour, half bbls. - - -	1,735		
Corn-meal, bbls. - - -	38,346	22,039	20,096
Bread, bbls. - - - -	25,975	26,000	2,543
Pork, bbls. - - - -	13,292	25,640	1,197
Corn, bbls. - - - -	24,478	47,360	16,500
Tobacco, hhds. - - - -	91	105	41
Beef, bbls. - - - -	1,800	1,900	315
Tongues, half bbls. - - -	1,500	1,100	315
Butter, firkins - - - -	15,365	16,100	1,500
White-oak staves - - -	353,265	64,200	21,000
Wood hoops - - - -	320,110	218,970	11,390
Lard, kegs - - - -	11,500	9,000	2,231

These are independent of imports to the outports, such as Falmouth, Montego Bay, &c.

The average net price of corn-meal for twenty years throughout the West Indies may be computed at $12 per puncheon, or $2 50 per bbl.—a price sufficient to recompense its manufacture.

During my late visit to Jamaica, I had the mortification to be told of and see corn-meal received from New Orleans unfit for that or any West India market; the shippers having acted in their own wisdom, cannot, by their losses, judge of the market. But to avoid similar occurrences, I will again repeat that the meal must be equal to the best Philadelphia kiln dried, made from the best yellow corn, packed in barrels of 196 lbs. net; and so packed,

that, on opening the barrel, it is perfectly full. The barrels should be clean when shipped, have a plug for convenience of sampling, well lined, and riveted. These regularities, so simple in their nature, properly attended to, place us at once in full and fair competition abroad; whereas, otherwise, we will linger for years laboring under prejudices against this article, when received from New Orleans, as was formerly the case with our flour in the West India markets, (and is yet in the Rio market,) without any known cause but want of attention in its manufacture at the beginning.

DANE.

NEW ORLEANS, *April* 29, 1845.

Liverpool prices current of American produce, made up from actual transactions, to January 4, 1846.

Five per cent. additional is charged on duties stated, except on sugar and breadstuffs. Provisions *for export or ship stores* pay no duty. Hams and bacon in pickle pay pork duty.

☞ Barrel is 200 lbs.; tierce is 304 lbs.; quarter is 8 bushels, of 70 lbs. each; cwt. is 112 lbs.; imperial gallon is 9 lbs.; tun is 252 imperial gallons; sack of flour, 280 lbs.; *a. v., ad valorem.*

Names of articles.		Prices. £ *s. d.* £ *s. d.*	Duty.
Ashes, pot	per cwt.	19 6 a 0 0	Free.
pearl	do	21 0 a 22 0	do
Bacon, in dry salt, duty paid	do	36 0 a 39 0	14s. per cwt.
Bark, quercitron	do	8 6 a 9 0	Free.
oak, (tanner's)	do	None	do
Beef, mess, in bond	per barrel	40 0 a 46 0	8s. per cwt.
prime, do	do	30 0 a 34 0	do
mess, do	per tierce	73 0 a 75 0	do
mess, new, in bond	do	78 0 a 80 0	do
Do do	per barrel	None	do
Beeswax, unbleached	per cwt.	7 10 0 a 7 15 0	Free.
Butter, prime, duty paid	do	80 0 a 84 0	20s. per cwt.
Canadian, do	do	74 0 a 86 0	5s. per cwt.
grease	do	Season over	Free.
Bones, shank	per ton	6 0 0 a 6 10 0	do
mixed	do	5 0 0 a 5 10 0	do
Castor oil	per pound	4½ a 5	do
Cheese, first quality, duty paid	per cwt.	52 0 a 55 0	10s. 6d. pr cwt.
ordinary, do	do	48 0 a 50 0	do
inferior, do	do	40 0 a 44 0	do
Hams, in salt, do	do	None	14s. per cwt.
in canvass	do	None	do
Hemp, dew rotted	per ton	20 0 0 a 22 0 0	Free.
Hides, wet salted	per pound	3 a 3¼	do
tanned	do	6 a 9	do
Horns	per 123	10 0 a 30 0	do
Horn tips	per cwt.	18 0 a 28 0	do
Lard, fine leaf, in kegs	do	47 0 a 47 0	do
in barrels	do	46 0 a 48 0	do
inferior	do	25 0 a 31 0	do
Linseed, cake	per ton	8 10 0 a 10 10 0	do
Lead, pig	do	17 0 0 a 17 10 0	£1 per ton.
Oil, lard	per tun	41 0 0 a 44 0 0	Free.
sperm, duty paid	do	80 0 0 a 83 0 0	£15 per tun.*
whale, do	do	26 10 0 a 30 0 0	£6 per tun.†

* Free after 1st January, 1847. † Free after 1st January, 1849.

Liverpool prices current—Continued.

Names of articles.		Prices.	Duty.
		£ s. d. £ s. d.	
Pitch - - - -	- per cwt.	8 0 a 0 0	Free.
Pork, thin prime mess, in bond -	- per barrel	55 0 a 60 0	8s. per cwt.
mess, do -	- do	None	do
prime, do -	- do	45 0 a 48 0	do
Rape, cake - - - -	- per ton	None	Free.
Rice, dressed, in bond - -	- per cwt.	30 0 a 34 0	6s. per cwt.
Rosin - - - - - -	- do	4 6 a 6 8	Free.
Staves, pipe, W. O. - - -	- per 1,200	16 0 0 a 17 0 0	do
hogshead - - -	- do	8 10 0 a 15 0 0	do
barrel - - -	- do	None	do
birch, for fisheries - -	- do	None	do
Sugar, Louisiana, do - -	- per cwt.	None	23s. 4d.
Seed, clover, duty paid - -	- do	50 0 a 65 0	10s. per quar.
flax - - - -	per 7 bushels	67 6 a 0 0	Free.
timothy - - -	- per cwt.	20 0 a 25 0	5s. per quar.
Tar - - - - - -	- per barrel	14 6 a 15 6	Free.
Tallow, duty paid - - -	- per cwt.	41 0 a 41 6	3|2 per cwt.
Tongues, ox, in bond - -	- per dozen	12 0 a 15 0	10s. per cwt.
pig, do - - -	- per cwt.	24 0 a 30 0	do
Turpentine - - - - -	- do	10 0 a 11 0	Free.
Turpentine, spirits, in bond - -	- do	65 0 a 70 0	5s. per cwt.
Whalebone, duty paid - -	- per ton	None	20 *a. v.*
Wool - - - -	- per pound	1 4 a 1 8	Free.
Breadstuffs.			
Flour, in bond - - -	- per barrel	28 0 a 28 6	9|0 per barrel.
Wheat, do - - -	- per 60 lbs.	0 0 a 0 0	15s. per quar.
Kidney beans, or black-eyed peas -	per 480 lbs.	42 0 a 45 0	Free.
Rye, in bond - - - -	- do	0 0 a 0 0	7|6 per quar.
Indian corn, in bond - -	- do	34 0 a 36 0	6s. per quar.
Barley, in bond - - -	- per 60 lbs.	0 0 a 0 0	5s. per quar.

Imports into Liverpool.

	Beef.		Pork.	Cheese.		Butter.
	Tierces.	*Barrels.*	*Barrels.*	*Casks.*	*Boxes.*	*Packages.*
1843 -	3,500	5,005	2,956	4,922	19,004	13,060
1844 -	9,300	8,354	7,939	5,674	18,641	3,458
1845 -	15,553	3,337	7,930	5,017	44,445	2,500

Imports—Continued.

	Hams.		Lard.		Tallow.	
	Loose.	*Casks.*	*Barrels.*	*Kegs.*	*Hogsheads.*	*Barrels.*
1843 -	–	623	23,962	24,650	1,600	2,200
1844 -	2,500	441	20,027	28,960	2,116	2,801
1845 -	–	–	9,346	56,324	3,502	3,233

Stocks on hand at Liverpool, January 1st.

	Beef.	Pork.	Cheese.	Tallow.	Lard.	Beeswax.	Cloverseed.	Qu. bark.	Flaxseed.
	Tierces.	*Barrels.*	*Tons.*	*Casks.*	*Tons.*	*Tons.*	*Tons.*	*Hhds.*	*Tierces.*
1844 -	6,080	829	285	800	696	None	190	1,550	None.
1845 -	3,427	3,368	160	200	100	10	60	1,650	1,200
1846 -	3,800	4,800	270	800	460	-	100	840	4,500

Prices, January 1st.

	Beef.	Pork.	Cheese.	Lard.	Tallow.
	s. d. s. d.	*s. d. s. d.*	*s. d. s. d.*	*s. d. s. d.*	*s. d. s. d.*
1843 -	65 0 a 75 0	28 0 a 36 0	48 0 a 51 0	41 0 a 42 0	0 0 a 0 0
1844 -	70 0 a 76 0	36 0 a 42 0	45 0 a 48 0	33 0 a 34 0	0 0 a 0 0
1845 -	70 0 a 75 0	60 0 a 61 0	50 0 a 54 0	42 0 a 46 0	38 0 a 41 0
1846 -	78 0 a 80 0	58 0 a 62 0	52 0 a 55 0	45 0 a 47 0	40 0 a 41 6

REVIEW OF THE MARKET.

LIVERPOOL, *January* 3, 1846.

DEAR SIR: The commencement of another year, the fourth since the opening of the trade, finds the American provision business established on a firm basis. Prejudice has almost entirely disappeared; and most of the articles in the preceding prices current are judged only by their real merits comparatively with previous customary supplies. In curing, cutting, and packing, there is still something to learn. Neatness, cleanliness, and sightliness are continually requisite, as well as an adaptation as closely as possible to the uses and customs of our markets.

Prices have been favorable to imports during most part of the year, and throughout have been safe for extensive operations until *now*, for it is feared much of the shipments on the way will result disastrously. The reports as to prospects of a supply of food in this country were and are certainly gloomy enough, but the unreasonable prices demanded, and, in too many instances, paid in the United States, cannot have much effect in brightening them, as the enhanced value puts them quite out of the reach of the laboring classes, which natural result appears be be overlooked by shippers.

Beef.—The imports of beef have reached a safe maximum, being about equal to a reasonable demand. Prices have opened high, and would easily retain present value were packers more careful to retain the reputation of their brands; but, out of the numerous parcels already received, only *one* has opened equal in style to previous shipments. The great error has been in curing with dirty pickle, insufficient in quality and strength; but some have so far forgotten their own interests as to place the coarsest and roughest parts of their cattle in tierces marked "prime mess." The unprofitable results of such shipments will, perhaps, prevent a repetition of such management.

Pork.—There has not been a satisfactory business in pork. The imports have been to usual extent, of which more than one half are still in stock. The first arrivals of last season were entirely satisfactory, but the after imports were more carelessly handled, and could not compete with Irish or Hamburg. Some very superior has lately arrived, and held at a price beyond the best Irish. It would be well if this superiority could always be maintained, although, unless prices give way in the United States, a profitable business cannot be done at present, prices here showing a tendency to give way rather than advance.

Ashes.—The trade in pot and pearl ashes does not increase. The imports have been 1,921 barrels of the former, and 827 of the latter, which have nearly all gone into consumption, at about present quotations. The irregularity of quality prevents an increased business.

Butter.—The great scarcity of grease-butter caused prices to advance to 50*s.* during the season, and there was none left over. The make and import of butter have been so much increased this season that we cannot look for such high rates to rule the coming year, although the quantity wanted will be very large. Butter for eating has not yet become an article of profitable import, nor will it until the duties are reduced. There are some small parcels here, and on the way, for which 60*s.*, in bond, must be considered an extreme quotation.

Cheese.—There has been a pleasant trade in cheese throughout the year. Prices in New York have got above our level at present, and put a stop to extensive business, but this is believed to be only temporary. At or under present prices, the consumption of England has capabilities for even yet greatly increasing imports. The quality is generally unexceptionable.

Seeds.—The business in seeds has been profitable during the past season when shipped with proper judgment. The imports of flaxseed this year have been unusually early, and it is hoped will not continue to be so extensive the balance of the season. With a fair supply, the market promises well, but at prices reduced from the last season. Fine cloverseed is expected to bring long prices, as the crops are short, and quality inferior throughout.

Hemp.—The unequal and inferior quality of hemp has been frequently noticed. Until packers give this subject necessary attention, little good can be done in this market; but were once a character established, an immense consumption would be had in England, as in strength and length of fibre American hemp is unequalled.

Wool.—The same fault, though in a less degree, of irregularity in packing, has been found with American wool, which is rapidly assuming much importance in this country. An extensive wool-broker in London, in writing to another part of the world, on this subject, uses language so well suited for the United States that I do not hesitate quoting it:

"The remedy appears to us, on this side of the water, so easy, that we feel astonished at the growers being so blind to their own interests.

"The men who shear the sheep can be told to cast aside any black or gray sheep's coats, and pack them separately;

"And the wool from sheep shorn in the grease can surely be kept apart, and packed separately;

"And the very coarse, half-bred, and low, kempy, native fleeces, can surely be packed separately;

"And the white, good, fine, and clean fleeces can be packed by themselves.

"If the care which we have been advocating were taken with your wools, the grower or dealer would, in making out his invoice, classify his produce as follows:

"A	1 to 10,	10 bales,		all fine clean fleeces, ewes, &c.
"B	11 to 12,	2	"	clean lambs'.
"C	13 to 15,	3	"	native fleeces.
"B	16 to 17,	1	"	greasy ewe fleeces.
"E	17,	1	"	greasy lambs' fleeces.
"F	19,	1	"	black and gray, lambs' and fleece.
"G	20,	1	"	locks and pieces picked up and shaken from the straw after shearing.

"We have no hesitation in saying, that, if the farmers can be induced to operate upon these remarks, and sort their wool properly, giving a faithful representation of the contents of the several packages, as above, their wool will acquire that popularity in the market to which their improved growth already entitles them; and, in short, their full value will be secured."

The imports of wool have been over 3,500 bags, but only a small portion has found buyers, the bulk of the arrivals having come in during December, when there was a total disinclination for business among all classes, and it is too early in the year to note any increased demand.

Hides.—During the first six months of the year the market was generally heavy, and prices declined fully $\frac{1}{2}d.$ per pound, but they have since experienced some slight improvement in value, although the demand is far from brisk, and the sales of last month do not exceed 800 hides, at $3\frac{1}{8}d.$ for New York, and $3\frac{1}{4}d.$ to $3\frac{3}{8}d.$ per pound for Philadelphia; leaving the present stock 7,300 hides, against 1,900 at this period last year. Import 36,970, against 31,500 in 1844, and 17,300 in 1843.

Sole leather.—Since the abolition of the customs' duties on leather, there have been some considerable imports from the United States, (estimated at about 25,000 sides,) the greater part of which, being tanned with hemlock bark, was exceedingly difficult of sale, although offered at very low rates: that portion tanned with oak bark found buyers; but the prices obtained were generally unremunerating to the shippers.

Lard.—Within the last week we have had large arrivals of lard from New Orleans, previous to which we had had heavy receipts from Philadelphia and New York. The price is, therefore, down at least 5*s.* below highest value of the season. The demand for culinary purposes is still limited, but is enough, unless further arrivals interfere, to clear off present stock without much further reduction. Many packages injure the lard so as to unfit it for eating purposes, by being charred inside when seasoning. The lard, consequently, is smutted.

Tallow.—The imports continue to increase, and the quality of many brands is now standard. At a price equal to Russian, any quantity can be placed; but this will not afford a profit at prices now ruling in America. There is a poor prospect of any advance. Only one third of the consumption of tallow in Great Britain is imported in the average of years, so that any increase of the home supply, and with the present consumption of meat in England it must be materially added to now, has a serious effect on prices of foreign.

Staves.—The importations of the year are equal to 516 M., chiefly of

W. O. puncheon. The sales during the month are limited, and stock is accumulating. Good W. O. pine have been sold at £14 15*s.* to £15 per M. The best demand is found for those suitable for cleaving into sugar hogshead staves of red or white oak. If an article for that purpose could be introduced, so that the staves would cost £7 10*s.* to £8 per M., this market would take off a large quantity.

Flour and breadstuffs.—In all business matters the last few weeks have been anxious and perilous. The resignation of Sir Robert Peel, the advent of Lord John Russell, and the recall of Sir Robert Peel, following in such sudden succession, are so full of meaning, that trade (suffering at same time by the panic in the money market) has been paralyzed; and, until the opening of Parliament shall have put us in possession of the real intentions of government, we cannot look for a prosperous revival. That an important change is about being made in our corn and provision laws all parties are agreed, and that the change will be a final settlement of this long vexed question is also fully believed; but its extent and conditions no man out of the government can tell, and speculation is various and useless. The guess which will be found nearest the truth, perhaps, is one which says a fixed duty on wheat, commencing at 12*s.*, and falling yearly to a minimum, will be proposed, accompanied with the compensation to landholders of taking from land one of its peculiar burdens, the poor-rates, and making them payable out of the general taxation of the country.

Whichever way this great question is settled, so it be settled, the United States will reap immense benefits. Another month will give us full particulars.

So small a portion of the railway schemes have reached maturity, that all fear for their effect on the money market has disappeared, and discounts have become comparatively easy.

Flour has been sold to a considerable extent, at 28*s.* to 29*s.*, in bond, which is 4*s.* to 5*s.* under highest price a few weeks since. The duty has advanced a step. Indian corn is not easy to sell at 34*s.*, in bond, although it is generally believed it will be admitted free of duty. Black-eyed peas are known here as kidney beans, and are free of duty since 1st of June, 1845.

With compliments of the season, I am, respectfully,

JAMES M'HENRY.

Prices current of American produce.

Names of articles.		Prices.	Duties.
		£ s. d. £ s. d.	
Beef, in bond—			
India and extra qualities	p. 336 lbs.	90 0 a 95 0	8s. per cwt.
U. S. prime mess	per tierce	70 0 a 80 0	
Do (new)	per bbl.	None	
Do (infer'r and old)	per tierce	50 0 a 56 0	
Canadian prime mess	do	None	2s. per cwt.
Do do	per bbl.	None	
Do do (inf'r & old)	do	None	
Pork, in bond—			
U. S. prime mess (new)	do	55 0 a 62 0	8s. per cwt.
U. S. prime (old)	do	44 0 a 50 0	
U. S. middles, in tierces	p. 336 lbs.	None	
Canadian prime mess	per bbl.	- -	2s. per cwt.
Canadian prime (old)	do	None	
Canadian middles, in tierces, duty paid	p. 336 lbs.	None	
Bacon, in dry salt, duty paid	per cwt.	None	Foreign, 14s. per cwt.; Colon., 3s. 6d. do.
Hams, dry, in bond	do	None	
Butter, duty paid—			
U. S. prime	do	None	20s. per cwt.;
Canadian	do	70 0 a 74 0	5s. do.
Grease	do	None	Free.
Cheese, duty paid—			
Prime quality	do	50 0 a 55 0	For'n, 10s. 6d. per cwt.; Col., 2s. 6d. do.
Ordinary	do	46 0 a 50 0	
Inferior	do	38 0 a 42 0	
Ox tongues, in pickle, in bond	per dozen	12 0 a 16 0	Foreign, 10s. per cwt.; Colon., 2s. 6d. do.
Tallow, duty paid	per cwt.	41 0 a 42 0	For'n, 3s. 2d. per cwt.; Colonial, 3d. do.
Cloverseed, duty paid	do	56 0 a 62 0	Foreign, 10s. per cwt.; Colonial, 5s. do.
Lead, (pig) in bond	per ton	18 0 0 a 18 10 0	20s. per ton.
Flour, United States, duty paid	per bbl.	None	As per average below.
in bond	do	28 0 a 28 6	
Canadian, duty paid	do	32 0 a 34 0	
(sour,) duty paid	do	30 0	
Wheat, United States, in bond	per 70 lbs.	7 0 a 7 6	
Canadian, free	do	8 9 a 9 3	
Peas, free	p. 504 lbs.	45 0 a 47 0	
Barley, free	p. 60 lbs.	4 0 a 4 6	
Indian corn, free	p. 480 lbs.	40 0 a 41 0	
Oatmeal, Canadian, free	p. 240 lbs.	31 0 a 31 6	
Whale fins	per cwt.	12 0 0 a 13 0 0	British taking free; foreign, 20 per cent.
Lard, fine leaf, in kegs	do	46 0 a 47 0	Free.
prime quality, in barrels	do	44 0 a 46 0	
inferior	do	39 0 a 41 0	
Lard oil	per ton	42 0 0 a 44 0 0	
Tallow and lard grease	per cwt.	30 0 a 31 0	
Linseed cake	per ton	9 0 0 a 11 0 0	
Rape cake	do	5 0 0 a 6 0 0	
Flaxseed (new)	per hhd.	62 0 a 65 0	
Hemp (dew-rotted)	per ton	20 0 0 a 21 0 0	
Hides, wet salted	per lb.	2¾ a 3	
dry salted	do	4 a 5	
Horns, Buffalo	per cwt.	18 0 a 23 0	
ox and cow	per 123	16 0 a 24 0	
Rosin	per cwt.	4 6 a 5 0	
Tar	per bbl.	15 6 a 17 0	
Turpentine	per cwt.	11 0 a 11 6	
Quercitron bark (Phil.)	do	9 6 a 10 0	

Prices current—Continued.

Names of articles.		Prices.	Duties.
Staves	per *mille* of 1,200	£ s. d. £ s. d.	
white oak, pipe	do	14 10 0 a 16 0 0	Free.
hogshead	do	10 0 0 a 12 0 0	Free.
Bones (mixed)	per ton	4 15 0 a 5 0 0	Free.
Beeswax	per cwt.	7 10 0 a 7 15 0	Free.
Ashes, Montreal, pot	do	23 0 a 23 6	Free.
pearl	do	23 6 a 23 9	Free.
United States, pot	do	None	Free.
pearl	do	22 6 a 23 0	Free.
Wool, Merino, sheep	per lb.	1 6 a 1 9	Free.
lambs'	do	1 8 a 1 11	Free.
skin	do	1 3 a 1 6	Free.

Prices current—Continued.

	Wheat.	Oats.	Indian corn.	Peas.	Flour.
	s. d.	s. d.	s. d.	s. d.	s. d.
Average prices of the six weeks which regulate the duty	58 0	24 10	33 5	44 4	
Duty during the present week	14 0	4 0	5 0	1 0	8 5
Duty on colonial produce	1 0	6	6	6	7½

5 per cent. extra is charged on the amount of the above duties, except on grain, flour, &c. Provisions for export or ship stores *pay no duty.* Hams and bacon, in pickle, pay duty as pork. The cwt. is 112 lbs.; the Imperial gallon is 9 lbs.; the tun is 252 Imperial gallons; the quarter is 8 bushels; the barrel of provisions is 200 lbs.; the tierce is 304 lbs.

A shilling is equal to 24 cents.

Imports of North American produce from 1st to 31st December, 1845, inclusive.

	Beef.		Pork.	Hams.	Tallow.		Lard.	
	Tierces.	*Barrels.*	*Barrels.*	*Casks.*	*Hhds.*	*Barrels.*	*Barrels.*	*Kegs.*
From the United States	1,940	515	375	20	357	90	612	16,848
From Canada	20	95						

Imports—Continued.

	Butter.	Cheese.		Ashes.		Hides.	Wheat.	Flour.
	Casks.	*Casks.*	*Boxes.*	*Pot.*	*Pearl.*	*No.*	*Quar's.*	*Barrels*
From the United States	146	124	5,004	–	60	8,171	11,141	55,583
From Canada	1,543	42	–	2,087	959	–	10,884	48,667

Liverpool imports of North American produce, from 1st of January to 31st of December in each year.

Year.	Beef.		Pork.	Hams.	Tallow.		Lard.	
	Tierces.	*Barrels.*	*Barrels.*	*Casks.*	*Hhds.*	*Barrels.*	*Barrels.*	*Kegs.*
1843 -	5,306	2,856	1,749	614	2,685	1,996	23,550	20,706
1844 -	9,912	9,186	7,689	315	3,471	2,605	19,393	29,795
1845 -	15,171	3,487	7,913	73	3,520	3,619	10,471	54,292

Liverpool imports—Continued.

Year.	Butter.	Cheese.		Ashes.		Hides.	Wheat.	Flour.
	Casks	*Casks.*	*Boxes.*	*Pot.*	*Pearl.*	*No.*	*Quarters.*	*Barrels.*
1843 -	13,469	4,500	19,093	13,372	6,466	17,225	13,256	100,322
1844 -	3,789	5,287	18,245	11,806	5,724	35,160	23,073	346,568
1845 -	9,791	5,322	43,981	14,239	6,516	54,681	41,895	363,402

LIVERPOOL, *January* 1, 1846.

The commencement of the past year was ushered in by the prospects of the greatest commercial prosperity, and the realization of those continued steady with us for eight months, when the first rumors of a bad harvest came on us in such a form as not to be mistaken or trifled with; and with the past experience of the evil working of our corn laws, prudent men, foreseeing the certain result of an export of bullion to pay for foreign corn, immediately decided on contracting their engagements, and preparing for that tightness in the money market which was sure to follow. This, joined to the immense amount of capital invested or promised for all kinds of railway stock, produced a panic which has now continued for three months; and though it certainly has caused much individual suffering, still the general tone of commercial matters is healthy, and trade, though in some measure paralyzed for a time, is not seriously injured, as may be evidenced by the fact that money is becoming more easy, discounts lower, manufacturers in full employ, the working classes in the receipt of large wages, and the consumption of all produce unusually great; along with this, the agricultural population, as a whole, are in a more prosperous state, the shipping interest remunerating the owners, and the formation of railways over the three kingdoms giving ample occupation to every one disposed to be employed. If our recent political changes were once arranged, the corn laws fixed on a permanent and just basis, and the general policy of our government known, commercial confidence would be at once restored; and enjoying, as we do, peace with all the world, we have reason to look forward with good hopes for the year on which we have entered.

As to our trade with the United States, we have not much general news to communicate since our last. The usual dulness which generally prevails at this season of the year, with the rumors, in every case greatly exaggerated, of the almost certainty of a collision between the governments

of Great Britain and the United States on the Oregon question, all tended to keep us in a state of disquietude, and to limit operations. We are glad, however, on the receipt of the President's message, to see that, though in some points rather warlike, still it showed some disposition for an amicable settlement; and while with one hand the President displays no disinclination for war, he as evidently with the other offers the branch of peace in the form of a decided modification of the tariff; thus following in *our* rapidly extending sound principles of free trade, the light of which appears to be gradually spreading over the most *antiquated* nations of Europe.

Cotton has experienced some variation in prices during the month, owing solely to the impression that difficulties might arise with the United States; but there is so much good feeling for peace and conciliation rising up among the intelligent commercial community of both countries, that this impression cannot be used to force up prices, and sales have gone on at a full average to meet the current demand of the manufacturers, without a variation of more than one-fourth pence per pound.

Wool.—We continue to receive small shipments of wool, which is and will continue to come more into favor. The quality of the staple of some considerable portion is very good; but the Americans, so far, do not sort it properly, but mix all qualities together without due care, thus injuring the general character of the whole shipment. The sales made in last month have been very trifling, at rates under our December quotations.

Beef.—In this article we must do the curers the justice to say that they have all but monopolised our market for the supply of our commercial navy. It is true that some curers have, partly from inattention and partly from design, no doubt been induced to pay less attention to cut, cure, and regularity of packing; they must, however, be told that this is bad policy for their own interests. The expenses on good and bad are equal, and inferior brands will be always looked on with suspicion, and realize lower prices, perhaps, than their actual value—quality with us, in every case of food, being the first object. The sales of the month past have been very trifling, at our prices noted above; but in this article, as in all others, we expect a decided improvement.

Pork does not improve. We find a growing dislike for this article; though offered fully 12 per cent. below Irish, yet it does not sell. This is owing to the soft nature of the pork itself, and partly to the want of that neatness and care which characterise the Irish brands of this article. There have also been a number of true complaints that it does not do for long voyages, and that the extra waste is more than equivalent to the difference between it and Irish.

Cheese.—The arrivals of cheese have not been large, and yet, strange to say, fully equal to the demand. We can account for this most satisfactorily from two causes. The first is, that we have a very heavy make of English, which has been pressed freely on the market; and, secondly, the price of American has so advanced as not only to equal, but in reality to be higher than our own make; and though the quality has no doubt much improved, and is good, yet the large mass of the consumers naturally prefer home make when to be bought at as low or lower rates. We must reduce our quotations 1*s.* *a* 2*s.* per cwt.; but it would require a further fall of 4*s.* *a* 5*s.* before quantity could be sent into consumption equal to last year.

Lard.—At last we have an ample supply of this article, as importers and holders will find, to their cost, before they clear off their present stocks.

The sale has been very limited indeed, and prices must be quoted fully 2*s.* lower, with a downward tendency; and, from present prospects, we shall go down still further before sales to extent can be made.

Tallow continues rather dull. The heavy supplies, at the commencement of last month, operated as a check on free buying; still, holders are very firm, and will not give way 3*d.* to effect sales, under the impression that this dulness is but temporary.

Hides have not altered in value. The amount of sales has been rather limited; but prices have been firmly supported, and in this month we expect to clear off most of our stock at our quotations.

Hemp has improved decidedly during the month, owing to an advance in Russia of 30*s.* per ton, and very small arrivals from the States. We have been able to realize an advance of 20*s.* to some extent, which is likely to be maintained.

Ashes.—We have no change for the better. This market for the season has not shown a limit for a margin for shipments, but we think we have now passed the lowest point.

Cloverseed remains steady at our quotations. Very trifling arrivals of new, but our recent advices from the States quote prices which would leave a serious loss to the shipper in this market, unless we advance still further.

Flaxseed.—The demand has not yet commenced; the arrivals so far are equal to former years, but the quality of the seed inferior to last season. The character of American seed has also suffered with us from the fact that the hogsheads do not contain the proper quantity, many of them proving one half bushel short—sufficient to destroy that confidence which exists towards Dutch seed in this market.

Lead in limited supply, and wanted. The recent arrivals have been taken off freely at our quotations.

Oils remain unaltered in value. The recent arrivals from the States have not given satisfaction, from the fact that most parcels were more or less adulterated.

Tobacco remains firm. The stock on hand is about equal to last year. The demand is steady from the manufacturers, who, in general, are bare of stock.

Oil-cake.—We have received very little so far this season, though several heavy shipments have arrived in London. The quality of what we have is very good, and the condition, from its being all in casks, very superior, selling freely from £9 15*s.* *a* £11 per ton.

Corn.—The recent extraordinary political changes have caused great excitement in this article, as it is well known that the contemplation of a proposed change in our sliding-scale of duties was one (and that not the least) reason of the late apparent disunion in our cabinet. Rumor now says, and we think with truth, that our present government has decided on finally placing this question at rest, either by a total repeal of the duty altogether, relieving the landed interest from some taxes which they deem peculiar to themselves, or else by affixing a low standard—say 4*s.* *a* 6*s.* per quarter as a permanent duty, which, with the cost of transport, they may consider as an ample protection for the agricultural interests. We merely state these as rumors, as nothing certain is known, nor likely will be until after the 22d of January next, when Parliament is to assemble. In the mean time, large quantities of all kinds of breadstuffs have been daily arriving from almost every port in the United States, proving the immense resources of

that country, if the policy of our respective governments was conducted on the broad principles of doing the greatest possible benefit to the greatest number. Our arrivals have been all bonded of course, the importers acting on the belief that a change must be made, which certainly would benefit bonded produce, and would depress free. Our quotations show the present current value at which a fair amount of business is doing, and, from the reasons already stated in this circular, we look forward that any change in the value of United States breadstuffs must be for the better.

With our best wishes for a year of prosperous trade to our friends, we are, respectfully,

J. & C. KIRKPATRICK.

From Willmer & Smith's European Times of January 4, 1846.

I.—IMPORTS INTO THE UNITED KINGDOM.

An account of the imports of the principal articles of foreign and colonial merchandise, in the ten months ended 5th of November, 1845, compared with the imports of the corresponding ten months of the years 1843 and 1844.

Articles.		Quantities imported. Ten months ended 5th November, 1843.	1844.	1845.
Animals, living, viz.—				
Oxen and bulls	number	1,019	2,889	8,188
Cows	do	348	836	4,600
Calves	do	36	53	565
Sheep	do	190	1,272	8,263
Lambs	do	6	16	112
Swine and hogs	do	319	237	656
Bacon	cwts.	441	26	43
Barilla and alkali	tons	2,092	2,157	2,710
Bark for tanners' or dyers' use	cwts.	700,216	548,701	492,808
Beef, salted, not corned, viz.—				
Of British Possessions	do	11,030	18,451	4,674
Foreign	do	28,979	77,328	66,441
Fresh or slightly salted	do	67	2	1,847
Butter	do	128,549	151,110	206,035
Cheese	do	124,060	153,178	201,089
Cocoa	pounds	1,643,068	3,178,932	3,242,181
Coffee, viz.—				
Of British Possessions	do	14,235,775	19,451,865	17,387,435
Foreign	do	17,304,233	14,525,519	19,816,397
Total of coffee	do	31,540,008	33,977,384	37,203,832
Corn, viz.—				
Wheat	quarters	837,966	1,054,428	518,002
Barley	do	157,943	841,348	312,431
Oats	do	63,984	258,830	449,523
Rye	do	2,660	25,082	305
Peas	do	30,880	99,253	44,746
Beans	do	46,998	127,641	133,739

Imports into the United Kingdom—Continued.

Articles.		Quantities imported. Ten months ended 5th November, 1843.	1844.	1845.
Corn, viz.—				
Maize or Indian corn	quarters	515	23,361	50,013
Buckwheat	do	2	573	1,772
Malt	do	25		
Wheatmeal or flour	cwts.	210,116	904,866	520,225
Oatmeal	do	2,289	3,726	2,825
Indian meal	do	1	105	
Dyes and dyeing stuffs, viz.—				
Cochineal	do	7,108	6,719	6,913
Indigo	do	28,058	50,304	81,214
Lacdye	do	8,485	4,725	10,477
Logwood	tons	15,472	20,330	17,396
Madder	cwts.	113,130	76,340	51,571
Madder root	do	74,106	75,437	115,405
Sumac	tons	11,033	7,732	9,328
Eggs	number	62,273,472	60,114,345	66,803,780
Fish, of foreign taking, viz.—				
Eels	ship's lading	71	82	76
Turbots	cwts.	53	84	106
Oysters	bushels	1	1	
Salmon	cwts.	910	1,024	1,088
Soles	do	14	–	1
Turtle	do	249	382	296
Fresh, not otherwise described	do	519	1,129	718
Cured, not otherwise described	do	176	175	19,207
Flax and tow, or codilla of hemp and flax	do	1,195,375	1,491,668	1,213,458
Fruits, viz.—				
Currants	do	111,814	142,401	180,985
Figs	do	8,294	5,739	15,778
Lemons and oranges	chests or boxes	207,053	265,348	268,478
Lemons and oranges	number (loose)	31,159	30,848	24,613
Lemons and oranges	at value, £	1,286	597	1,159
Raisins	cwts.	115,130	58,656	151,266
Gloves, leather	pairs	1,649,949	1,665,123	1,949,066
Hams	cwts.	5,607	6,032	4,697
Hemp, undressed	do	511,557	755,566	700,034
Hides, untanned	do	447,472	502,853	575,865
Mahogany	tons	13,189	18,680	27,464
Meat, salted or fresh, not otherwise described	cwts.	81	237	110
Molasses	do	491,637	493,211	464,521
Metals, viz.—				
Copper ore	tons	43,913	45,205	47,458
unwrought	cwts.	555	24,474	2,047
Iron, in bars, unwrought	tons	8,675	19,913	24,981
Steel, unwrought	cwts.	23,279	35,808	19,409
Lead, pig and sheet	tons	2,280	2,721	3,326
Spelter	do	8,707	7,675	9,885
Tin, in blocks, ingots, bars, or slabs	cwts.	21,465	8,755	10,607
Oil, viz.—				
Train, blubber, sperm	tuns	17,502	16,645	19,188
Palm	cwts.	283,922	362,841	376,170
Cocoanut	do	54,962	70,861	27,154
Olive	tuns	10,099	14,063	6,889
Opium	pounds	176,282	213,604	237,026
Pork, salted, viz.—				
Of British Possessions	cwts.	11,474	534	1,484
Foreign	do	14,850	21,579	31,812

Imports into the United Kingdom—Continued.

Articles.		Quantities imported. Ten months ended 5th November, 1843.	1844.	1845.
Pork, viz.—				
Fresh	cwts.	-	-	115
Quicksilver	pounds	2,004,986	1,725,314	1,850,540
Rice	cwts.	329,725	343,453	416,092
in the husk	quarters	17,482	36,627	43,092
Saltpetre and cubic nitre	cwts.	481,259	283,210	360,745
Seeds, viz.—				
Clover	do	50,873	71,235	124,314
Flaxseed and linseed	quarters	332,885	521,624	483,925
Rape	do	64,966	60,943	38,935
Silk, viz.—				
Raw	pounds	2,531,970	3,321,066	3,484,768
Waste, knubs, and husks	cwts.	19,043	13,309	12,185
Thrown, of all sorts	pounds	300,822	325,998	385,151
Silk manufactures of Europe, viz.—				
Silk or satin, plain	do	140,920	148,162	151,720
figured or brocaded	do	90,402	104,108	92,398
Gauze, plain	do	4,180	4,720	19,515
striped, figured, or brocaded	do	8,388	12,337	15,176
tissue foulards	do	614	39	25
Crape, plain	do	2,801	3,701	4,249
figured	do	236	94	41
Velvet, plain	do	14,515	13,935	19,608
figured	do	2,375	2,606	3,018
Silk manufactures of India, viz.—				
Bandanas and other silk handkerchiefs	pieces	348,996	432,318	554,749
Skins, viz.—				
Goat, undressed	number	402,178	204,977	318,948
Kid, undressed	do	61,470	135,762	107,685
dressed	do	379,638	364,412	400,036
Lamb, undressed	do	1,133,614	1,248,117	1,656,972
tanned, tawed, dressed	No.	10,369	2,795	12,886
Spices, viz.—				
Cassia lignea	pounds	2,037,742	1,080,767	944,798
Cinnamon	do	212,908	421,010	569,195
Cloves	do	94,180	141,554	372,034
Mace	do	18,306	13,174	14,689
Nutmegs	do	160,788	77,655	80,229
Pepper	do	2,373,106	4,751,947	6,038,200
Pimento	cwts.	17,272	2,360	24,992
Spirits, viz.—				
Rum (including overproof)	gallons	3,383,430	2,658,343	3,960,585
Brandy	do	1,739,037	1,179,361	1,597,097
Geneva	do	297,298	321,774	347,703
Sugar, unrefined, viz.—				
Of British Possessions in America, without distinction of quality	cwts.	2,195,801	2,006,205	241,622
Equal to white clayed	do	-	-	40
Not equal to white clayed	do	-	-	2,273,291
Of Mauritius, equal to white clayed	do.			
Not equal to white clayed	do	447,719	483,909	649,412
Of British Possessions in the East Indies, (into which the importation of foreign sugar is prohibited,) without distinction of quality	do	927,244	838,879	272,366
Equal to white clayed	do	-	-	10,218
Not equal to white clayed	do	-	-	632,916

Imports into the United Kingdom—Continued.

Articles.		Quantities imported. Ten months ended 5th November, 1843.	1844.	1845.
Sugar, unrefined, viz.—				
Of other British Possessions in the East Indies, equal to white clayed - -	cwts.			
Not equal to white clayed - -	do	–	2,164	2,187
Foreign, the produce of free labor, or admitted at the same rate of duty under treaty, equal to white clayed - -	do	–	–	548
Not equal to white clayed - -	do	–	–	111,870
Foreign, other kinds - - - -	do	828,608	571,249	559,851
Total of sugar - - -	do	4,399,372	3,902,406	4,754,327
Tallow - - - - - -	do	800,232	607,360	730,638
Tar - - - - - - -	lasts	13,119	8,254	7,740
Tea - - - - - - -	pounds	35,271,914	33,477,225	41,992,561
Timber and wood, viz.—				
Battens and batten ends, foreign, entered by tale - - - -	hundrds.	59	82	29
Boards, deals, deal ends, and plank, foreign, entered by tale - - -	do	193	111	96
Deals, battens, boards, or other timber or wood, sawed or split, of British Possessions - - - -	loads	251,723	302,506	379,921
Foreign - - - - - -	do	181,702	215,839	250,326
Staves - - - - - -	do	41,981	52,498	55,431
Timber or wood, not being articles sawed or split, or otherwise dressed, except hewn, and not otherwise charged with duty, of British Possessions - -	do	434,165	370,783	604,183
Foreign - - - - - -	do	97,056	159,386	199,976
Tobacco, unmanufactured - - -	pounds	14,000,923	13,373,195	13,917,452
Manufactured, and snuff - -	do	800,585	635,448	1,605,814
Turpentine, common - - -	cwts.	397,437	387,198	399,641
Wine, viz.—				
Cape - - - - - -	gallons	34,899	242,930	279,879
French - - - - - -	do	344,552	516,028	442,099
Other sorts - - - - -	do	4,230,248	5,649,678	5,632,427
Total of wine - - -	do	4,609,699	6,408,636	6,354,405
Wool, cotton, viz.—				
British Possessions - - -	cwts.	478,529		
Foreign - - - - -	do	5,174,392		
Total - - - -	do	5,652,921	5,218,795	5,648,794
Wool, sheep and lambs' - - -	pounds	40,740,065	57,799,369	65,216,613

II.—EXPORTS OF FOREIGN AND COLONIAL MERCHANDISE FROM THE UNITED KINGDOM.

An account of the exports of the principal articles of foreign and colonial merchandise, in the ten months ended 5th of November, 1845, *compared with the exports of the corresponding ten months in the years* 1843 *and* 1844.

Articles.		Quantities exported. Ten months ended 5th November, 1843.	1844.	1845.
Cocoa	pounds	368,842	1,220,253	109,397
Coffee, viz.—				
Produce of British Possessions in America and Africa	do	119,092	148,538	593,314
Foreign	do	10,793,224	5,155,686	18,132,609
Corn, viz.—				
Wheat	quarters	43,405	43,687	47,168
Barley	do	4,444	41,012	22,784
Oats	do	37,366	18,317	25,060
Wheatmeal and flour	cwts.	37,864	89,090	24,641
Dyes and dyeing stuffs, viz.—				
Cochineal	do	4,015	6,070	4,212
Indigo	do	32,970	47,960	43,866
Lacdye	do	2,827	4,252	7,259
Logwood	tons	2,503	3,076	2,575
Metals—				
Copper, unwrought	cwts.	502	20,778	5,958
Iron, in bars or unwrought	tons	3,352	5,401	2,143
Steel, unwrought	cwts.	26,090	35,603	28,654
Lead, pig	tons	2,108	2,989	2,596
Spelter	do	4,062	4,925	2,164
Tin	cwts.	10,986	16,223	16,373
Oil, olive	tuns	335	367	287
Opium	pounds	248,455	153,586	217,611
Quicksilver	do	936,841	1,268,213	1,249,631
Rice, not in the husk	cwts.	182,834	156,092	334,825
Spices—				
Cassia lignea	pounds	1,832,630	1,227,986	1,107,309
Cinnamon	do	259,464	513,167	496,454
Cloves	do	21,151	55,552	319,405
Mace	do	7,454	19,303	18,098
Nutmegs	do	17,974	23,611	53,360
Pepper	do	2,389,375	3,072,676	6,966,213
Pimento	cwts.	18,847	4,961	22,076
Spirits, viz.—				
Rum (including overproof)	gallons	939,868	626,441	716,475
Brandy	do	669,146	592,635	973,540
Geneva	do	276,415	308,889	310,820
Sugar, unrefined, viz.—				
Of British Possessions in America	cwts.	3,350	252	269
Of Mauritius	do	197	55	308
East India, of British Possessions	do	3,146	641	5,168
Foreign, of all sorts	do	433,804	325,266	597,269
Tobacco—				
Unmanufactured	pounds	6,599,153	6,991,280	7,190,703
Foreign manufactured, and snuff	do	620,253	737,805	1,098,921
Wine, viz.—				
Cape	gallons	962	2,041	2,841
French	do	117,047	121,053	131,416
Other sorts	do	1,025,293	1,308,356	1,258,815
Wool, cotton, viz.—				
Of British Possessions in America	cwts.	332,664	380,267	365,973
Of other parts	do			
Wool, sheep and lambs'	pounds	2,599,376	1,553,629	2,304,120

III.—EXPORTS OF BRITISH PRODUCE AND MANUFACTURES FROM THE UNITED KINGDOM.

An account of the exports of the principal articles of British and Irish produce and manufactures, in the ten months ended 5th *November*, 1845, *compared with the exports of the corresponding ten months in the years* 1843 *and* 1844.

Articles.	Declared value of the exportations. Ten months ended 5th November, 1843.	1844.	1845.
Coals and culm	£602,423	£569,090	£841,687
Cotton manufactures	13,330,581	15,923,434	16,288,959
yarn	6,250,106	6,137,839	5,976,769
Earthenware	520,347	675,786	720,488
Glass	289,217	332,637	321,325
Hardwares and cutlery	1,413,646	1,839,114	1,827,916
Linen manufactures	2,291,374	2,562,702	2,537,612
yarn	717,686	864,991	893,670
Metals, viz.—			
Iron and steel	2,187,537	2,850,571	3,080,964
Copper and brass	1,414,853	1,440,955	1,502,941
Lead	228,199	235,155	192,695
Tin, in bars, &c.	93,855	67,817	45,608
Tin plates	344,437	416,643	519,493
Salt	183,424	195,572	186,888
Silk manufactures	550,725	636,357	658,088
Sugar, refined	348,562	290,634	406,936
Wool, sheep or lambs'	385,405	451,455	493,685
Woollen yarn	587,676	857,182	925,993
Woollen manufactures	5,604,311	7,230,887	6,669,099
Total of the foregoing articles	37,344,364	43,578,821	44,090,816

[From Willmer & Smith's European Times of February 4, 1846.]

A statistical account of cotton-wool, yarn, twist, and manufactured goods, imported, exported, and taken for consumption, in Great Britain, for 1845 and previous years.

Exported to—	Calicoes, printed and died.					Shawls and handkerchiefs.				
	1841.	1842.	1843.	1844.	1845.	1841.	1842.	1843.	1844.	1845.
	Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Dozen.*	*Dozen.*	*Dozen.*	*Dozen.*	*Dozen.*
Barbary and Morocco - -	96,874	30,970	17,982	27,800	77,500	2,623	-	145	-	500
*Brazils - - - -	41,282,411	28,381,374	30,644,663	39,764,383	36,092,024	121,746	61,630	111,467	119,362	70,075
*Buenos Ayres, Montevideo, &c. -					6,536,732					27,010
British West Indies - - -	9,774,720	14,181,095	16,861,099	14,789,016	20,729,641	30,894	19,915	36,363	69,959	79,978
British North America - -	10,703,415	7,255,081	8,291,405	12,771,979	13,362,173	5,105	1,629	5,070	5,667	7,392
Belgium - - - - -	2,533,519	1,934,811	1,413,852	1,888,156	1,078,421	4,116	3,583	14,800	10,549	5,570
Coast of Africa, exclusive of Cape -	3,774,811	5,129,077	12,026,293	4,963,491	5,454,125	31,832	30,216	22,544	29,488	21,748
Chili and Peru - - -	10,393,428	14,002,709	14,135,005	14,880,965	24,841,575	20,450	10,151	5,888	15,737	66,624
Cape of Good Hope - - -	1,904,239	2,379,336	3,668,432	2,461,680	3,520,302	3,283	4,850	16,114	22,909	31,343
Colombia - - - -	2,373,619	3,292,669	3,222,814	4,157,937	7,780,578	7,564	8,366	31,962	21,451	12,633
Denmark - - - - -	138,586	97,551	542,665	395,803	285,064	574	1,032	5,166		
Egypt - - - - -	1,942,765	719,034	451,427	1,467,690	419,798	16	-	674	14	616
France - - - - -	1,805,957	1,739,325	1,418,368	4,856,283	1,545,993	2,992	1,006	3,379	2,722	1,539
Foreign West Indies - - -	14,005,374	10,604,257	9,403,226	13,021,806	22,578,110	23,673	17,961	27,278	39,508	49,411
Gibraltar - - - -	8,552,952	10,501,067	9,187,128	13,481,714	6,657,072	14,196	7,370	23,970	11,773	4,498
Hanse Towns, &c. - - -	31,348,638	22,670,851	32,278,426	30,527,177	27,520,261	44,246	43,695	82,048	145	508
Hanover - - - - -	50,989	21,874	18,087	26,748	86,144	394	89			
Holland - - - - -	16,854,305	10,547,350	9,686,931	12,213,669	12,424,821	8,072	14,945	28,044	1,990	218
†India - - - - -	22,540,756	19,483,329	21,741,803	23,945,398	26,083,138	17,655	3,287	4,860	11,653	91,687
†China - - - - -				6,184,390	2,535,413				8,910	6,511
Malta and Ionian Isles - -	3,391,333	3,221,336	2,805,126	2,156,036	3,106,134	979	1,609	1,849	1,432	4,245
Mauritius and Batavia - -	2,596,534	1,368,350	1,533,822	1,893,821	1,973,939	2,466	1,013	1,206	4,485	2,225
Mexico - - - - -	4,183,007	2,745,090	5,078,541	4,161,403	7,410,869	41,656	51,631	68,926	1,922	10,035
New Holland - - - -	997,092	1,113,395	3,077,091	2,168,956	3,850,891	4,540	2,543	4,831	2,551	4,824
Naples and Sicily - - -	5,086,990	5,098,482	4,252,233	5,255,557	5,084,005	15,663	29,191	53,361	30,231	37,600
Prussia - - - - -	338	620	851	660	5,510					
Portugal, Madeira, &c. - -	12,582,749	12,662,001	13,419,893	16,679,499	10,969,240	15,164	22,623	8,067	17,507	15,227
Russia - - - - -	152,922	183,449	60,651	231,779	160,908	492	2,408	791	834	216

Sweden and Norway	399,606	616,895	603,031	585,385	519,674	5,692	13,970	1,833	160	1,121
Spain	206,229	344,762	155,558	11,694	90,144	2,647	1,960	2,720	9	253
Sardinia, Tuscany, &c.	15,846,168	13,688,528	13,956,243	14,847,425	12,044,401	51,209	56,146	40,238	37,710	31,244
Trieste, Austrian ports, &c.	4,993,483	2,484,821	2,315,365	3,221,269	4,365,007	3,788	10,977	9,361	14,785	44,099
Turkey and Levant	22,209,185	23,821,288	27,806,642	48,063,251	28,563,239	11,974	7,370	1,047	8,791	14,373
United States of America	26,025,281	15,691,333	7,720,651	12,008,635	13,097,851	47,970	13,786	24,288	102,046	99,730
Total	278,748,275	236,012,641	257,787,304	313,111,455	310,850,697	543,665	444,952	638,400	596,200	743,053

* Previous to 1845, the exports to Brazils and States of La Plata were entered under one head; since then they have been made separate.

† Previous to 1844, the exports to India and China were entered under one head; since then they have been made separate.

STATISTICS—Continued.

Exported to—	Hosiery. 1841.	1842.	1843.	1844.	1845.	Ginghams. 1842.	1843.	1844.	1845.
	Dozen.	Dozen.	Dozen.	Dozen.	Dozen.	Yards.	Yards.	Yards.	Yards.
Barbary and Morocco	14	-	10						
*Brazils	108,395	54,154	33,031	39,144	17,491	12,000			
*Buenos Ayres, Montevideo, &c.					23,738				
British West Indies	33,493	35,320	33,433	36,947	28,572	28,987	39,751	80,210	58,938
British North America	34,518	30,629	26,430	37,781	50,545	2,360	45,189	26,336	9,582
Belgium	4,730	4,112	7,317	2,755	4,121	1,603	2,492	3,954	6,265
Coast of Africa, exclusive of Cape	872	6,179	508	2,523	158,026	622,459	681,511	1,235,798	915,645
Chili and Peru	26,486	21,302	17,732	26,066	38,464	-	-	30,160	
Cape of Good Hope	6,542	9,339	11,265	7,918	2,033	234,244	1,008,967	82,156	141,150
Colombia	2,656	1,032	1,882	2,354	1,702	6,960	16,060	83	1,676
Denmark	64	29	-	-	100	90			
Egypt	-	-	17						
France	1,471	637	948	999	3,088	2,380	31,980	1,288	
Foreign West Indies	9,022	10,735	11,647	9,366	8,382	-	-	360	
Gibraltar	4,295	12,238	5,958	5,239	5,798	-	1,893	6,000	
Hanse Towns, &c.	6,935	2,810	5,012	1,807	8,990	739,772	618,283		
Hanover	-	-	-	-	-	1,060			
Holland	11,644	5,785	10,053	7,696	9,997	18,084	3,994	9,862	1,156
†India	24,432	16,720	23,137	47,140	16,635	1,242	9,095	3,304	30,697
†China				1,096	283				
Malta and Ionian Isles	1,450	1,045	1,033	668	460	-	77,850		
Mauritius and Batavia	10,275	8,345	4,073	3,469	7,144	-	2,973	17,324	14,760
Mexico	2,287	1,189	1,552	1,262	1,293				
New Holland	21,098	30,375	50,305	35,236	52,927	5,013	10,364	9,386	33,445
Naples and Sicily	548	20	74	16					
Prussia									
Portugal, Madeira, &c.	5,531	2,850	2,473	3,998	1,018	3,441	496	1,057	
Russia	2,926	4,536	2,421	2,555	3,796				
Sweden and Norway	-	574	113	369	171	669	360		
Spain	487	320	694	50	108	200	200		
Sardinia, Tuscany, &c.	657	988	1,806	1,477	1,578	600			

Trieste, Austrian ports, &c.	75	122	93	322	74				
Turkey and Levant	1,769	685	487	418	219				
United States of America	115,317	68,086	80,542	101,231	78,792	128	6,848	2,100	1,450
Total	437,982	330,156	334,046	379,902	525,554	1,681,291	2,558,306	1,509,378	1,214,764

* Previous to 1845, the exports to Brazils and States of La Plata were entered under one head; since then they have been made separate.
* Previous to 1844, the exports to India and China were entered under one head; since then they have been made separate.

STATISTICS—Continued.

Exported to—	Ticks, &c.				Nankeens.			
	1842.	1843.	1844.	1845.	1842.	1843.	1844.	1845.
	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.
Barbary and Morocco								
*Brazils *Buenos Ayres, Montevideo, &c.	-	-	-	-	18,000	3,500		
British West Indies	3,307	21,356	20,672	13,287	5,269	4,982	988	4,820
British North America	3,916	3,575	1,183	727	-	-	225	215
Belgium	-	60	1,518	-	105	71	164	357
Coast of Africa, exclusive of Cape	2,883	8,667	7,637	13,502	3,369	2,142	-	2,916
Chili and Peru	-	-	15,436	-	-	950	71,490	
Cape of Good Hope	13,535	36,081	25,988	39,649	1,200	3,500	-	2,882
Colombia	-	-	-	-	-	91,013		
Denmark	924							
Egypt								
France	500	-	-	-	-	130		
Foreign West Indies	-	830						
Gibraltar	150	11,590	80	-	150	2,900	2,238	
Hanse Towns, &c.	3,640	76	-	-	265,827	24,899		
Hanover								
Holland	1,170	1,268	744	-	3,750	1,112	12,071	
†India †China	3,783	-	6,778	2,000				
Malta and Ionian Isles	4,793	4,015	-	-	-	-	1,332	
Mauritius and Batavia	-	1,630	7,803	6,922	11,780			
Mexico								
New Holland	27,665	96,037	40,250	34,876	720	807	-	42,225
Naples and Sicily								
Prussia								
Portugal, Madeira, &c.	566	630	2,987	901	2,008	164,329	3,120	2,449
Russia								
Sweden and Norway	140							
Spain	-	1,100	-	-	6,000			
Sardinia, Tuscany, &c.								

Trieste, Austrian ports, &c.								
Turkey and Levant	-	500						
United States of America	-	-	-	240				
Total	66,972	186,415	131,176	112,204	317,878	300,335	91,628	55,864

* Previous to 1845, the exports to Brazils and States of La Plata were entered under one head; since then they have been made separate.

† Previous to 1844, the exports to India and China were entered under one head; since then they have been made separate.

STATISTICS—Continued.

Exported to—	Cotton yarn.								
	1837.	1838.	1839.	1840.	1841.	1842.	1843.	1844.	1845.
	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.
Barbary and Morocco	–	–	600	2,400	400				
*Brazils; *Buenos Ayres, Montevideo, &c.	108,521	27,776	24,333	17,138	15,503	–	5,616	48,010	1,900
British West Indies	93,854	15,290	32,060	51,006	33,075	7,299	54,270	247,605	76,533
British North America	234,428	248,902	595,711	545,880	507,629	298,425	543,389	788,908	847,064
Belgium	221,336	75,970	54,872	39,343	40,572	101,567	327,489	3,717,497	3,917,267
Coast of Africa, exclusive of Cape	76,922	233,344	5,814	8,815	2,790	133,862	140,192	5,572	84,897
Chili and Peru	–	34,100	17,200	61,420	–	–	2,039	904	118,400
Cape of Good Hope	19,140	11,320	14,887	28,459	10,690	1,957	16,239	119,503	15,047
Colombia	242,653	2,732	500	200	–	162	3,460	3,220	10,696
Denmark	97,856	29,700	29,645	73,088	196,033	343,242	317,396	709,501	617,180
Egypt	660,700	1,268,495	32,016	–	654,968	289,550	424,761	326,250	85,740
France	354,025	98,713	73,093	78,252	114,716	122,316	145,765	71,938	76,786
Foreign West Indies	55,520	65,541	1,180	3,592	4,200	1,801	11,890	100	15,100
Gibraltar	280,114	257,374	37,810	75,403	83,233	88,995	116,372	65,146	65,870
Hanse Towns, &c.	36,104,778	38,646,576	36,883,805	37,359,477	41,870,291	47,823,956	45,713,058	33,608,150	40,315,592
Hanover	–	188,105	449,596	1,136,545	1,069,117	2,325,689	1,640,410	2,313,520	3,115,338
Holland	17,235,896	22,733,186	20,611,240	22,021,506	16,376,618	22,041,247	25,883,712	16,768,035	21,556,043
†India; †China	9,013,319	10,969,816	8,486,915	12,806,830	15,639,562	17,706,211	19,531,056		
†India								17,522,841	14,116,237
†China								3,487,334	2,402,750
Malta and Ionian Isles	371,760	743,156	264,795	383,989	667,650	1,152,342	1,998,110	795,386	1,315,474
Mauritius and Batavia	–	26,800	–	–	–	–	64,550	–	272
Mexico	1,931,825	674,810	–	42,250	504,160	44,740	29,462	8,114	
New Holland	10,016	9,865	5,416	199,509	5,934	990	46,878	16,857	43,222
Naples and Sicily	3,765,400	5,829,572	3,331,660	4,222,298	5,916,723	4,771,371	6,518,569	3,926,203	6,229,423
Prussia	4,324	15,788	2,120	17,577	20,924	40,300	77,604	206,317	140,264
Portugal, Madeira, &c.	313,364	731,136	539,642	433,932	666,517	603,559	636,084	887,605	807,080
Russia	23,910,019	18,799,716	18,660,531	18,191,074	16,468,921	21,417,429	23,283,956	24,045,209	18,167,962
Sweden and Norway	899,518	1,014,923	1,270,708	1,281,285	2,372,899	2,428,433	3,239,480	2,287,207	2,127,567

Spain - - -	3,100	10,026	10,120	4,700	194,770	15,040	8,836	-	1,460
Sardinia, Tuscany, &c. -	3,354,145	3,501,981	2,848,508	3,769,920	3,471,336	3,951,313	4,312,472	3,364,337	4,482,539
Trieste, Austrian ports, &c. -	1,999,393	2,961,894	2,062,296	1,349,072	2,068,485	1,792,420	2,085,530	2,785,572	2,443,775
Turkey and Levant - -	3,387,171	4,260,607	2,579,009	3,008,756	6,467,694	8,987,786	11,932,573	11,935,355	8,670,950
United States of America -	357,432	265,983	117,557	242,855	220,068	45,160	103,199	39,717	69,507
Total - - -	105,106,529	113,753,197	99,043,639	107,456,575	115,665,488	136,537,162	149,214,437	133,101,913	131,937,935

* Previous to 1845, the exports to Brazils and States of La Plata were entered under one head; since then they have been made separate.
† Previous to 1844, the exports to India and China were entered under one head; since then they have been made separate.

STATISTICS—Continued.

Exported to—	Cambrics and muslins.				
	1841.	1842.	1843.	1844.	1845.
	Yards.	Yards.	Yards.	Yards.	Yards.
Barbary and Morocco					
*Brazils	263,804	146,759	265,876	261,442	400,454
*Buenos Ayres, Montevideo, &c.					207,023
British West Indies	1,641,684	427,402	564,000	388,117	538,819
British North America	107,191	78,179	124,258	128,274	239,064
Belgium	227,839	175,718	131,663	164,328	142,440
Coast of Africa, exclusive of Cape	34,818	54,540	17,009	33,590	56,966
Chili and Peru	14,000	24,878	4,600	59,035	284,075
Cape of Good Hope	149,250	89,194	100,408	84,033	386,763
Colombia	8,630	–	13,444	17,454	52,777
Denmark	528	5,390	3,437	2,040	1,323
Egypt	1,200				
France	95,163	56,328	37,150	53,656	30,013
Foreign West Indies	178,960	86,900	86,879	53,241	81,802
Gibraltar	42,282	42,538	174,585	23,859	78,982
Hanse Towns, &c.	435,363	207,905	152,810	105,557	124,724
Hanover	–	2,380	–	684	
Holland	136,368	55,951	88,543	152,852	88,065
†India	952,019	341,292	400,503	626,485	459,129
†China				3,574	3,000
Malta and Ionian Isles	30,158	19,614	24,967	11,729	22,792
Mauritius and Batavia	112,289	190,949	156,380	79,670	13,194
Mexico	69,734	12,736	27,432	41,140	61,777
New Holland	161,232	168,542	338,962	99,792	237,762
Naples and Sicily	29,441	12,906	32,478	690	219
Prussia	160				
Portugal, Madeira, &c.	46,069	28,996	52,413	72,254	30,380
Russia	72,162	36,335	8,570	36,330	19,199
Sweden and Norway	41,600	94,933	52,435	55,493	75,520
Spain	17,634	7,078	4,368	586	4,194
Sardinia, Tuscany, &c.	37,477	22,100	90,330	–	16,244

Trieste, Austrian ports, &c.	6,880	700	308	1,908	8,242
Turkey and Levant	19,110	22,260	28,000	22,435	98,810
United States of America	585,121	285,915	430,174	600,402	1,034,216
Total	5,518,166	2,698,618	3,411,982	3,180,545	4,797,968

* Previous to 1845, the exports to Brazils and States of La Plata were entered under one head; since then they have been made separate.
† Previous to 1844, the exports to India and China were entered under one head; since then they have been made separate.

STATISTICS—Continued.

Exported to—	Cotton and linen, mixed.				Cords, velveteens, &c.			
	1842.	1843.	1844.	1845.	1842.	1843.	1844.	1845.
	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.
Barbary and Morocco								
*Brazils	318,551	215,220	696,482	300,929	66,020	30,592	-	1,380
*Buenos Ayres, Montevideo, &c.				15,173				
British West Indies	265,975	203,497	143,078	125,472	35,400	23,713	21,298	33,998
British North America	17,700	50,697	23,244	50,275	126,449	104,135	115,537	60,844
Belgium	2,412	2,922	425	88	28,633	55,957	80,036	103,441
Coast of Africa, exclusive of Cape	9,640	-	-	630	33,601	9,969	9,945	16,506
Chili and Peru	10,800	9,559	1,371	-	3,840	54,485	46,391	5,680
Cape of Good Hope	5,570	6,580	3,566	8,831	154,230	140,786	104,478	159,662
Colombia	33,445	34,959	62,326	59,057	-	1,167	306	4,921
Denmark	-	-	-	-	2,260	200	210	
Egypt	-	-	-	-	-	2,882	-	860
France	-	7,725	4,993	2,673	25,784	88,854	97,105	88,308
Foreign West Indies	141,322	175,921	163,021	440,429	-	-	-	2,758
Gibraltar	83,425	147,342	110,094	-	3,743	480	14,428	2,008
Hanse Towns, &c.	39,710	82,327	3,840	3,552	1,089,361	628,198	675,426	723,523
Hanover	-	-	-	-	1,230	1,313		
Holland	11,777	6,775	1,360	1,288	152,460	88,268	38,390	15,668
†India	18,940	8,722	12,640	15,265	8,447	50,891	25,562	41,332
†China			1,000	-			4,569	245
Malta and Ionian Isles	2,333	1,783	3,860	-	13,998	2,320	4,059	612
Mauritius and Batavia	481	-	1,800	1,650	5,302	7,000	1,690	1,219
Mexico	-	11,866	11,709	35,422	-	9,433	-	9,590
New Holland	11,680	19,761	18,987	11,766	19,277	46,539	41,781	116,401
Naples and Sicily	66,500	990	1,580	8,800	55,866	120,563	141,797	141,442
Prussia	170	-	-	-	-	-	-	720
Portugal, Madeira, &c.	-	287	5,861	470	10,096	3,885	17,745	8,654
Russia	-	-	-	-	5,075	1,104	8,348	
Sweden and Norway	325	11,130	5,213	-	19,072	9,904	4,245	4,572
Spain	-	-	-	3,714	8,985	7,116	2,231	990
Sardinia, Tuscany, &c.	594,625	58,297	21,052	10,630	6,285	5,765	2,345	52,110

Trieste, Austrian ports, &c.	53,095	6,126	10,050	-	3,335	20,870	29,133	12,045
Turkey and Levant	-	208	9,152	3,291	150	2,530	4,306	
United States of America	11,780	146,984	273,685	229,499	335,449	312,370	313,154	232,133
Total	1,700,256	1,209,678	1,590,389	1,328,904	2,214,448	1,831,289	1,804,518	1,841,619

* Previous to 1845, the exports to Brazils and States of La Plata were entered under one head; since then they have been made separate.

† Previous to 1844, the exports to India and China were entered under one head; since then they have been made separate.

STATISTICS—Continued.

Exported to—	Calicoes, plain.					Laces, &c,			
	1841.	1842.	1843.	1844.	1845.	1842.	1843.	1844.	1845.
	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.
Barbary and Morocco	1,203,798	253,425	197,210	299,000	31,600	-	8,339	-	2,000
*Brazils	47,189,215	31,977,181	45,293,498	56,636,533	45,982,091	998,681	767,841	700,550	400,344
*B. Ayres, Montevideo, &c.					7,134,737				131,262
British West Indies	9,831,280	13,792,147	16,600,534	15,171,050	16,987,142	452,130	671,989	557,533	637,157
British North America	7,757,332	5,596,638	9,919,469	12,921,968	11,580,586	536,347	817,791	1,135,284	1,892,442
Belgium	797,774	679,690	647,989	4,253,495	2,246,587	10,173,955	12,680,178	8,519,086	10,548,004
Coast of Africa, exclusive of Cape	1,181,957	5,712,560	17,707,801	1,894,016	5,755,800	278,450	26,387	17,855	3,491
Chili and Peru	7,211,373	17,578,463	12,168,464	9,170,264	20,149,503	276,670	269,192	242,612	405,274
Cape of Good Hope	2,008,352	1,840,656	4,943,783	2,024,918	3,394,241	331,025	570,998	81,740	162,806
Colombia	1,724,501	2,694,762	5,336,454	2,618,021	5,445,122	93,420	69,046	210,151	111,590
Denmark	104,040	139,154	444,377	839,366	467,912	3,172	4,032	-	1,031
Egypt	8,646,764	4,329,953	9,586,822	9,724,791	3,696,560	24,000	-	-	2,267
France	327,471	1,442,875	3,326,257	947,366	1,040,698	14,694,067	12,943,039	13,610,889	13,254,426
Foreign West Indies	7,487,614	6,147,747	6,611,688	8,740,650	15,018,973	22,563	1,817,260	605,349	513,987
Gibraltar	12,159,855	14,760,053	20,250,988	15,765,260	16,139,177	1,831	357,132	4,445	81,447
Hanse Towns, &c.	16,630,261	14,361,198	18,984,352	19,241,510	16,523,393	38,538,772	51,532,775	37,789,312	33,379,209
Hanover	23,854	6,770	30,710	57,004	27,451	-	-	14,604	7,891
Holland	18,440,841	13,683,294	27,014,624	13,890,634	14,178,738	15,215,760	15,482,999	18,317,068	15,436,161
†India	113,462,644	125,302,943	191,253,520	177,771,711	166,946,565	459,282	1,069,157	985,469	454,234
†China				83,101,487	106,490,275			504	26,078
Malta and Ionian Isles	6,130,900	6,507,325	4,229,376	4,718,483	8,106,371	143,498	25,290	39,180	13,032
Mauritius and Batavia	1,996,063	1,358,998	2,361,917	2,286,212	3,067,609	37,667	40,800	60,137	33,000
Mexico	2,542,406	2,894,674	2,165,036	1,016,184	1,994,483	34,881	30,000	5,796	161,209
New Holland	985,823	1,239,775	3,980,894	3,168,093	3,961,699	573,196	360,045	143,878	627,798
Naples and Sicily	4,941,685	5,180,302	2,469,567	4,406,657	3,876,834	323,270	344,257	483,816	542,698
Prussia	576	973	1,568	3,206	1,248				
Portugal, Madeira, &c.	19,290,132	16,931,183	25,434,969	26,637,858	23,971,656	10,712	20,501	27,423	41,919
Russia	825,317	1,585,418	1,056,522	901,985	823,577	344,468	401,225	738,206	997,807
Sweden and Norway	567,149	853,883	710,458	886,993	755,941	70,612	100,726	10,418	72,310
Spain	254,401	128,172	270,977	162,655	376,202	2,605	11,058	1,420	14,648

Sardinia, Tuscany, &c. -	17,880,582	16,687,033	21,185,190	16,309,598	16,885,890	257,745	620,923	151,706	648,550
Trieste, Austrian ports, &c.	8,263,691	7,432,799	8,799,326	7,857,569	9,505,852	45,848	106,646	22,000	74,131
Turkey and Levant -	35,121,748	39,817,072	50,221,000	56,591,435	68,161,151	29,289	30,401	150,225	115,382
United States of America	11,957,053	5,120,403	7,736,295	9,661,820	12,412,981	2,612,137	4,237,088	6,275,285	6,802,868
Total - -	366,946,452	366,040,519	520,941,635	569,677,792	613,138,645	86,586,053	105,417,115	90,901,921	87,596,453

* Previous to 1845, the exports to Brazils and States of La Plata were entered under one head; since then they have been made separate.
† Previous to 1844, the exports to India and China were entered under one head; since then they have been made separate.

STATISTICS—Continued.

Exported to—	Cotton thread.					Counterpanes, &c.			
	1841.	1842.	1843.	1844.	1845.	1842.	1843.	1844.	1845.
	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.	Number.	Number.	Number.	Number.
Barbary and Morocco	1,800	–	–	–	–	–	60		
*Brazils	308,097	144,430	247,852	314,721	173,283	25,620	4,435	8,552	34,046
*Buenos Ayres, Montevideo, &c.					75,701				600
British West Indies	29,862	19,084	41,098	50,961	53,920	25,725	24,529	12,832	24,577
British North America	37,504	30,993	80,220	127,529	53,983	11,197	7,379	18,544	14,514
Belgium	72,660	66,017	55,265	63,714	69,281	194	21		
Coast of Africa, exclusive of Cape	4,703	7,915	2,689	7,252	12,636	516	287	914	1,095
Chili and Peru	77,828	149,539	117,834	64,046	135,670	256	–	1,140	1,190
Cape of Good Hope	3,251	7,369	7,422	11,826	7,804	4,435	6,417	8,180	19,175
Colombia	14,724	19,923	52,168	51,465	75,736	–	17	85	180
Denmark	52	390	2,351	1,000	1,882				
Egypt	24,100	15,300	3,297	20,700	4,270				
France	118,356	170,051	97,538	106,032	86,632	764	679	632	1,090
Foreign West Indies	109,484	104,167	101,250	140,958	158,141	1,480	4,997	2,384	5,929
Gibraltar	52,159	110,193	200,526	128,306	150,098	283	435	845	681
Hanse Towns, &c.	1,765,953	224,285	252,438	317,216	252,787	420	5,030	869	852
Hanover	–	–	1,180	200					
Holland	1,226,507	84,745	151,719	111,535	102,091	1,212	1,393	374	196
†India	92,079	103,757	99,589	100,373	70,195	200	1,815	1,478	3,633
†China				700	10,004				
Malta and Ionian Isles	7,476	5,456	6,171	4,102	44,610	341	914	491	531
Mauritius and Batavia	6,237	2,776	1,950	1,242	6,978	24	–	18	121
Mexico	5,085	84,021	102,143	25,152	24,140	–	–	170	
New Holland	6,977	2,826	9,727	14,716	11,008	8,008	10,040	9,714	18,221
Naples and Sicily	35,569	21,512	169,450	29,290	45,621	204	500	222	481
Prussia	–	260	4,838	24,313	2,599				
Portugal, Madeira, &c.	127,898	103,018	102,577	160,564	123,289	79	295	332	13
Russia	6,764	6,839	16,247	16,745	24,859	1,403	661	1,155	298
Sweden and Norway	22,462	13,821	9,576	18,590	23,371	70	96	93	106
Spain	5,076	1,035	8,057	440	731	10	202		
Sardinia, Tuscany, &c.	155,367	148,710	117,160	173,059	196,336	–	181	1,102	350

Trieste, Austrian ports, &c.	20,353	30,096	41,622	64,891	91,304	234	162	91	160
Turkey and Levant	9,726	9,598	2,050	70,332	54,747	80	174	326	92
United States of America	567,000	284,506	388,779	509,069	423,929	5,235	7,097	16,247	26,691
Total	4,915,109	1,972,632	2,594,783	2,731,039	2,567,705	87,930	77,916	86,790	154,812

* Previous to 1845, the exports to Brazils and States of La Plata were entered under one head; since then they have been made separate.
† Previous to 1844, the exports to India and China were entered under one head; since then they have been made separate.

STATISTICS—Continued.

Exported to—	Tapes, &c.				Quiltings and ribs.			
	1842.	1843.	1844.	1845.	1842.	1843.	1844.	1845.
	Dozen.	*Dozen.*	*Dozen.*	*Dozen.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*
Barbary and Morocco								
*Brazils	498	-	-	294	-	1,456		
*Buenos Ayres, Montevideo, &c.				-				
British West Indies	33,350	10,327	8,565	1,212	3,579	1,839	6,089	971
British North America	3,859	2,150	430	392	779	131	130	646
Belgium	115	96	-	587	39,066	24,534	43,529	49,900
Coast of Africa, exclusive of Cape	42	1,694	3,382	1,902	407	1,934	2,134	860
Chili and Peru								
Cape of Good Hope	3,740	666	816	2,901	700	934	271	1,244
Colombia	-	-	-	17				
Denmark	-	-	59					
Egypt								
France	-	-	-	1,260	9,879	12,899	13,697	13,935
Foreign West Indies	-	476						
Gibraltar	2,040	3,045	2,721	2,459	-	1,328	2,842	671
Hanse Towns, &c.	864	-	103	1,473	20,395	22,554	14,680	4,335
Hanover								
Holland	394	21	10	20	5,929	2,495	859	615
†India	1,858	4,984	-	413	1,261	2,487	2,729	567
†China			-	-			75	
Malta and Ionian Isles	2,719	656	638	473	410	131	243	55
Mauritius and Batavia	700	517	945	-	-	36	300	450
Mexico	-	1,668	-	-	-	-	-	633
New Holland	1,959	-	1,245	2,170	631	55	740	732
Naples and Sicily								
Prussia								
Portugal, Madeira, &c.	55	14	-	31	557	135	442	456
Russia					1,595	101	990	615
Sweden and Norway	241	350	110	570	105			
Spain	275	36	-	-	200	412		
Sardinia, Tuscany, &c.	-	-	300	-	391			

Trieste, Austrian ports, &c. - - -	-	-	-	-	320	160	248	383
Turkey and Levant - - -	-	-	420	-	-	120	1,453	46
United States of America - - -	100	-	106	398	2,732	11,777	2,698	24,509
Total - - - -	52,809	26,700	19,850	16,572	88,936	75,518	94,149	101,623

* Previous to 1845, the exports to Brazils and States of La Plata were entered under one head; since then they have been made separate.
† Previous to 1844, the exports to India and China were entered under one head; since then they have been made separate.

WEIGHT OF YARN IN MANUFACTURED GOODS EXPORTED FROM ENGLAND.

Statement showing the weight of yarn in manufactured cotton goods exported from England in 1845; also, the average value per piece, &c.; with the total amount of each description.

Description.	Nos. above	No. of yards, &c., of each description.	Length of each piece.	No. of pieces, &c., of each description.	Weight of yarn in each piece.	Total weight of yarn exported in goods.	Average price of each piece.	Total value of goods exported in 1845.
					lbs. oz.	*Pounds.*	*s. d.*	
Calicoes, printed and dyed - -	14	310,850,697	28 yards	11,101,811	4 4	47,182,696	9 6	£5,273,360
plain - - - -	7	613,138,645	24 "	25,547,443	5 12	146,897,796	6 6	8,302,919
Cambrics and muslins - - -	4	4,797,968	20 "	239,898	3 0	719,694	6 6	77,967
Cotton and linen, mixed - -	9	1,328,904	40 "	33,222	8 0	265,776	6 9	16,196
Dimities - - - -	5	16,524	60 "	275	12 0	3,300	9 9	289
Damasks and diapers - - -	3	10,670	36 "	296	10 0	2,960	21 0	295
Ginghams and checks - - -	10	1,214,764	20 "	60,738	3 8	212,583	19 11	26,826
Lawns and lenos - - -	6	6,474	20 "	324	2 8	964	8 10	157
Lace, net, &c. - - - -	17	87,596,453	50 "	1,751,929	8	875,964	9 8	766,469
Nankeens - - - -	12	55,864	50 "	1,117	8 8	9,494	8 9	894
Quiltings and ribs - - -	13	101,623	60 "	1,694	18 8	31,339	16 0	3,380
Ticks, checks, &c. - - -	19	112,104	50 "	2,242	20 0	44,840	39 11	2,158
Velveteens, velvets, &c. - -	11	1,841,619	60 "	30,693	22 12	698,265	19 3	61,258
Counterpanes, &c. - - -	8	154,812	No.	154,812	7 8	1,161,090	39 11	32,897
Hosiery - - - -	15	525,554	dozen	525,544	2 8	1,401,450	4 2½	238,689
Shawls and handkerchiefs - -	16	743,053	dozen	743,053	2 8	1,981,474	9 1	133,130
Tapes and bobbins - - -	18	16,572	dozen	16,572	1 0	16,572	3 7	1,588
Unenumerated - - - -	20	85,442	-	85,443	10 0	854,430	1 11	85,443
Total weight of yarn exported in manufactured goods in 1845 -						202,360,687	18⅜*d.* per lb.	15,282,447
Total weight of yarn exported -						131,937,935	12*d.* "	6,596,897
Total weight of thread -						2,567,705	17¼*d.* "	184,554
Total weight of yarn, and value, in 1845 -						336,866,327	-	22,063,898

Do	do	1844	323,362,810	-	20,500,949
Do	do	1843	322,841,410	-	18,668,257
Do	do	1842	268,352,474	-	15,068,586
Do	do	1841	258,871,745	-	17,247,084
Do	do	1840	229,779,422	-	16,578,040
Do	do	1839	230,053,673	-	17,462,286
Do	do	1838	236,900,809	-	17,966,837
Do	do	1837	207,576,839	-	16,153,859
Do	do	1836	198,860,910	-	23,656,408

BAGS OF COTTON-WOOL IMPORTED, EXPORTED, &c.

Statement showing the number of bags and bales of cotton imported, exported, taken for consumption, and the stock on hand in London, Liverpool, and Glasgow, each year, from 1831 to 1845, both inclusive.

Years.	Imported.	Exported, &c.	Taken for consumption, and destroyed by fire.	Stock in London, &c., 1st of January in each year.	Stock in Liverpool 1st of January in each year.	Stock in Glasgow 1st of January in each year.	Total stock 1st of January in each year.
	Bags.	*Bags.*	*Bags.*	*Bags.*	*Bags.*	*Bags.*	*Bags.*
1831	901,764	80,699	862,205	42,852	258,100	21,268	322,220
1832	902,240	65,100	858,434	37,381	212,350	26,575	276,306
1833	931,796	79,066	877,589	34,102	197,960	13,058	245,120
1834	946,585	90,895	883,280	35,243	180,780	9,127	215,150
1835	1,089,309	107,240	937,616	26,296	145,311	13,953	185,560
1836	1,191,744	100,853	1,031,094	24,470	184,700	20,843	230,013
1837	1,163,839	128,535	1,064,931	60,820	204,490	23,500	289,000
1838	1,429,062	102,370	1,265,116	64,150	170,853	24,370	259,373
1839	1,109,550	121,659	1,043,511	46,450	248,349	26,300	321,099
1840	1,599,343	126,045	1,274,729	31,640	206,049	27,790	265,479
1841	1,341,659	117,330	1,118,717	50,660	366,140	27,248	464,048
1842	1,384,894	141,457	1,221,693	68,240	429,830	40,190	538,268
1843	1,556,982	121,410	1,357,662	74,570	456,600	30,234	561,404
1844	1,479,331	134,882	1,427,482	84,160	653,900	46,692	785,955
1845	1,855,660	120,595	1,577,617	91,775	740,580	61,627	902,982
1846	-	-	-	90,060	885,480	84,990	1,060,430

COTTON-WOOL EXPORTED.

Statement showing the quantity of cotton-wool exported to the undermentioned ports from London, Liverpool, and Hull, in the years 1841, 1842, 1843, 1844, *and* 1845.

Exported to—	1841.	1842.	1843.	1844.	1845.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Abo - -	-	-	-	-	247,296
Amsterdam - -	398,496	657,518	1,706,286	477,568	501,760
Altona - -	323,232	219,250	106,064	77,280	85,456
Alaborg - -	-	-	1,790	13,440	
Antwerp - -	6,720	-	-	51,328	33,396
Bremen - -	21,392	2,937	236,948		
Belgium - -	6,328,224	8,510,746	2,669,147	4,889,920	4,887,344
Bergo - -	-	-	93,072	-	91,392
Bergen - -	-	-	120,512	-	7,280
Charlshann - -	-	-	-	-	283,584
China - -	-	70,792	46,256		
Christianstadt - -	-	185,696	5,824	297,360	66,640
Cronstadt - -	1,589,256	1,297,321	3,427,872	3,187,744	2,521,568
Christiana - -	29,072	192,731	16,320	135,632	128,800
Constantinople - -	82,096	52,735	-	37,296	
Copenhagen - -	1,792	104,921	-	1,344	
Cadiz - -	-	-	-	15,568	67,200
Calcutta - -	-	-	5,488		
Corunna - -	-	-	-	9,632	
Dordt - -	2,082,992	4,863,792	1,348,704	594,168	1,982,288
Dantzic - -	347,760	818,356	262,650	343,504	1,059,520
Drom - -	-	19,267	-	6,720	
Drontheim - -	-	-	-	1,008	
Elsineur - -	1,008				
Fredrickstadt - -	-	1,008			
Ghent - -	-	-	3,920		
Genoa - -	786,576	3,915,633	720,596	2,400,608	263,984
Gothenburg - -	37,644	-	614,546	1,595,664	157,808
Havre - -	87,136	540,013	163,072	197,008	40,992
Hamburg - -	9,206,960	12,109,104	9,702,184	11,393,312	7,992,320
Hong Kong - -	-	-	1,471,456	-	76,272
Konigsburg - -	95,984	114,262	121,200	30,797	51,296
Lisbon - -					
Miramichi - -	-	-	-	1,120	
Laurvig - -	1,232	12,240	2,688	1,568	
Leer - -	-	-	14,336	672	3,248
Marseilles - -	98,112	-	11,312		
Malta - -	10,080	-	-	-	896
Mogadore - -	-	3,248			
Naples - -	-	-	-	-	542,080
New Brunswick -	-	-	-	2,352	
Ostend - -	-	-	-	26,880	
Odessa - -	94,080	714,839	-	-	108,536
Petersburg - -	6,588,848	9,335,295	4,968,920	9,424,128	10,351,488
Pillau - -	2,016				
Rotterdam - -	6,595,792	9,811,379	5,705,856	5,888,064	8,498,784
Rostock - -	6,048	19,324	-	12,768	6,720
Riga - -	290,936	1,353,692	469,342	541,904	419,328
Rouen - -	2,352	3,808			
Pittea - -	-	-	-	3,360	
Stockholm - -	-	198,346	244,944	54,320	
Stettin - -	251,888	1,441,584	330,144	486,976	768,656
Stolpe - -	-	1,927			
Seville - -	-	-	-	11,312	
Shang Hae - -	-	-	-	36,960	
Stolpeminde - -	-	-	-	4,480	
Syria - -	41,164				
Stralsund - -	15,232	-	-	9,774	

STATEMENT—Continued.

Exported to—	1841.	1842.	1843.	1844.	1845.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Trieste - -	888,608	10,273,303	1,859,908	2,603,088	573,216
Tonsburg - -	33,488	326,195	16,688	22,400	2,688
Varel - -	–	1,680	–	50,288	
Venice - -	–	192,489	–	37,856	51,744
Udderwalla - -	–	–	–	38,640	
Walloe - -	8,064				
Wybing - -	35,168	198,732			
Wesby - -	672				
Zwoll - -	–	49,842	–	1,008	19,822

COTTON YARN EXPORTED.

Statement of cotton yarn exported from London, Liverpool, Hull, Poole, Bristol, and Newcastle-upon-Tyne, in the years 1844 *and* 1845, *together with the increase and decrease.*

Exported to—	1844.	1845.	Increase.	Decrease.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Brazil - - - - -	48,010	1,900	–	46,110
British West Indies - - -	247,605	76,533	–	171,072
British North America - -	788,908	847,064	58,156	
Belgium - - - -	3,717,497	3,917,267	199,770	
Coast of Africa - - -	5,572	84,897	79,325	
Chili and Peru - - -	904	118,400	117,496	
Cape of Good Hope - - -	119,503	15,047	–	104,456
Colombia - - - -	3,220	10,696	7,476	
Denmark - - - -	709,501	617,180	–	92,321
Egypt - - - - -	326,250	85,740	–	240,510
France - - - -	71,938	76,786	4,848	
Foreign West Indies - - -	100	15,100	15,000	
Gibraltar - - - -	65,146	65,870	724	
Hanse Towns, &c. - - -	33,608,150	40,315,592	6,707,442	
Hanover - - - -	2,313,520	3,115,338	801,818	
Holland - - - -	16,768,035	21,556,043	4,788,008	
India - - - - -	17,522,841	14,116,237	–	3,406,604
China - - - - -	3,487,334	2,402,750	–	1,084,584
Malta, &c. - - - -	795,386	1,315,474	520,008	
Mauritius, &c. - - -	–	272	272	
Mexico - - - -	8,114	–	–	8,114
New Holland - - - -	16,857	43,222	26,365	
Naples, &c. - - - -	3,926,203	6,229,423	2,303,220	
Prussia - - - -	206,317	140,264	–	66,053
Portugal, &c. - - - -	887,605	807,080	–	80,525
Russia - - - -	24,045,209	18,167,962	–	5,877,247
Sweden, &c. - - - -	2,287,207	2,127,567	–	159,640
Spain - - - - -	–	1,460	1,460	
Sardinia, &c. - - - -	3,364,337	4,482,539	1,118,202	
Trieste, &c. - - - -	2,785,572	2,443,775	–	341,797
Turkey, &c. - - - -	11,935,355	8,670,950	–	3,264,405
United States - - - -	39,717	69,507	29,790	
	130,101,913	131,937,935	16,779,460	14,943,438
		130,101,913	14,943,438	
Increase of cotton yarn exported in 1845 - - - -	–	–	1,836,022	

YARN SPUN IN ENGLAND AND SCOTLAND.

Statement showing the quantity of yarn spun in England and Scotland in the years 1841, 1842, 1843, 1844, *and* 1845.

		Pounds.
In England, in 1845 - - - - - - - -		467,029,465
In Scotland, in 1845 - - - - - - - -		27,737,022
Total quantity of yarn spun in 1845 - - - - -		494,766,487
In England, in 1844 - - - - -	lbs. 409,995,092	
In Scotland, in 1844 - - - - -	lbs. 35,582,388	
		445,577,480
Total increase of cotton yarn spun in 1845 - - - -		49,189,007
Total quantity of cotton yarn spun in 1843 - - - - -		437,589,441
Total quantity of cotton yarn spun in 1842 - - - - -		345,751,444
Total quantity of cotton yarn spun in 1841 - - - - -		370,768,077

PRICES OF MANUFACTURED GOODS EXPORTED.

Statement showing the average prices of manufactured goods exported in 1842, 1843, 1844, *and* 1845.

Description.	Nos. above	Length of pieces.	Weight of pieces.	1845.	1844.	1843.	1842.
		Yards.	lbs. oz.	s. d.	s. d.	s. d.	s. d.
Calicoes, printed and dyed -	7	28	4 4	9 5	9 6	8 11	8 9
Calicoes, plain - - -	6	24	5 12	6 4½	6 6	6 2	6 0
Cambrics and muslins -	8	20	3 0	6 8	6 9	6 4	6 3
Cotton and linen, mixed -	14	40	8 0	9 7¾	9 9	9 4	9 3
Dimities - - -	3	60	12 0	19 9½	21 0	20 0	20 0
Damasks and diapers -	10	36	10 0	19 10	19 11	19 0	19 0
Ginghams and checks -	15	20	3 8	8 9½	8 10	8 5	8 3
Lawns and lenos - -	11	20	2 8	9 7	9 8	9 2	9 0
Lace, net, &c. - -	13	50	0 8	8 8	8 9	8 4	6 3
Nankeens - - -	9	50	8 8	15 9	16 0	15 2	15 0
Quiltings and ribs - -	5	60	18 8	38 6	39 11	38 0	38 0
Ticks, checks, &c. - -	18	50	20 0	18 9	19 3	18 4	18 3
Velveteens, cords, &c. -	16	60	22 12	38 7	39 11	38 3	38 0
Counterpanes, &c. - -	4	No.	7 8	4 2	4 2	4 0	4 0
Hosiery - - -	12	Dozen	2 8	9 0	9 1	8 8	8 6
Shawls and handkerchiefs -	19	Dozen	2 8	3 7	3 7	3 5	3 3
Tapes and bobbins - -	17	Dozen	1 0	1 10½	11 1	1 10	1 9

PRICE OF POWER-LOOM CLOTH.

Statement showing the monthly price of power-loom cloth for the year 1845.

Date.	Seven-eighths printers.			Nine-eighths printers.			Shirtings.
	26 inches 64—4 lb. 2 oz. to 4 lb. 7 oz.	27 inches 66—4 lb. 8 oz. to 4 lb. 12 oz.	27 inches 72—4 lb. 13 oz. to 5 lb.	36 inches 66—5 lb. 2 oz. to 5 lb. 6 oz.	36 inches 72—5 lb. 8 oz. to 5 lb. 10 oz.	36 inches 72—5 lb. 8 oz. to 5 lb. 12 oz.	40 inches 60.
	29 yards.	29 yards.	29 yards.	25 yards.	25 yards.	25 yards.	37½ yards.
	s. d. s. d.	s. d. s. d.	s. d. s. d.	s. d. s. d.	s. d. s. d.	s. d. s. d.	s. d.
January 1, 1845	5 3 to 5 4½	5 4½ to 5 9	5 10½ to 6 4½	5 7½ to 6 0	6 2 to 6 4	6 6 to 6 10	9 6
February 1, 1845	5 3 to 5 4½	5 4½ to 5 9	5 10½ to 6 4½	5 9 to 6 1½	6 3 to 6 4	6 7 to 7 0	9 6
March 1, 1845	5 1 to 5 2	5 2 to 5 7½	5 7½ to 6 1½	5 9 to 6 1½	6 3 to 6 4	6 8 to 7 0	9 3
April 1, 1845	5 0 to 5 1½	5 1 to 5 6	5 6 to 6 0	5 9 to 6 0	6 3 to 6 4	6 8 to 7 0	9 3
May 1, 1845	4 10½ to 5 0	5 0 to 5 4½	5 3 to 5 7	5 7½ to 5 10½	6 0 to 6 1½	6 6 to 6 9	9 1½
June 1, 1845	4 9 to 4 10½	4 10½ to 5 3	5 4½ to 5 9	5 7 to 5 10½	6 0 to 6 3	6 7½ to 6 10	9 1½
July 1, 1845	4 9 to 4 10½	4 10½ to 5 4½	5 6 to 6 0	5 6 to 5 10½	6 0 to 6 3	6 8 to 6 10	9 1½
August 1, 1845	4 10½ to 5 0	4 10½ to 5 4½	5 6 to 6 0	5 6 to 5 10½	6 0 to 6 3	6 8 to 6 10	9 2½
September 1, 1845	4 10½ to 5 0	4 10½ to 5 4½	5 9 to 6 3	5 7½ to 6 0	6 2 to 6 4½	6 8 to 7 0	9 2
October 1, 1845	4 9½ to 5 0	4 10 to 5 4	5 7½ to 6 1	5 7½ to 5 11	6 0 to 6 3	6 8 to 6 10½	9 1½
November 1, 1845	4 9 to 5 0	4 9 to 5 3	5 6 to 6 0	5 6 to 5 10½	6 0 to 6 2	6 6 to 6 9	9 0
December 1, 1845	4 8 to 4 11	4 8 to 5 2	5 4 to 5 11	5 4 to 5 9	5 11 to 6 2	6 5 to 6 8	8 10
January 1, 1846	4 6 to 4 10	4 4½ to 5 0	5 1½ to 5 7½	5 3 to 5 6	6 0 to 6 1½	6 4 to 6 6	8 9

PRICES OF WATER AND MULE TWIST.

Statement showing the prices of water and mule twist in Manchester on the 31st December, in the years 1843, 1844, *and* 1845.

Numbers.	WATER TWIST.						MULE TWIST.					
	Common seconds.			Best seconds.			Common seconds.			Best seconds.		
	1843.	1844.	1845.	1843.	1844.	1815.	1843.	1844.	1845.	1843.	1844.	1845.
	d.	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*
6, 8, 10, 12	6¾	6½	6⅜	7¾	7½	7⅛	6½	6½	6⅜	7½	7½	7¾
20	7¾	8	7⅞	8⅝	8½	8⅝	7½	7½	7⅝	8½	8½	8⅜
30	9	9	8⅞	12½	10	9¾	8½	8¾	8⅝	10	9½	9⅜
40	12½	12½	12⅝	15¾	13½	13⅜	9	9⅜	9⅝	11¼	10	10⅜
50	-	-	-	-	-	-	10½	11	10⅞	11¾	12	11¾
60	-	-	-	-	-	-	12½	13½	12⅜	14¼	16½	13½
70	-	-	-	-	-	-	14¾	16	14⅞	17½	18½	16¾
80	-	-	-	-	-	-	16½	18½	18¼	19½	20½	21⅛

IMPORT AND SALES OF COTTON-WOOL.

Statement showing the import of cotton-wool into Liverpool weekly, during the year 1845; *also, the number of bags and bales sold to the dealers, spinners, and exporters, the reported sales to speculators, &c., and the weekly price of Uplands for* 1845.

1845.	No. of bags imported.	No. of bags taken by the trade.	No. of bags taken by exporters.	No. of bags taken by speculators.	Total No. of bags sold.	Weekly price of Uplands, 1845.
January 4	72,640 (Jan. 4 and 11)	7,800	150	1,500	9,300	3 to 4½
11		27,000	300	1,000	28,300	3½ to 4½
18	40,883	37,610	300	6,000	43,910	3¼ to 4¾
25	39,414	41,300	300	3,000	44,600	3⅜ to 4¾
Feb. 1	25,066	27,120	1,600	4,800	33,520	3⅝ to 4½
8	18,700	30,150	800	8,900	39,850	3 to 5
15	19,620	30,500	150	25,300	55,950	3¾ to 5
22	36,788	20,220	450	15,050	35,720	3½ to 4⅝
March 1	34,206	24,380	150	17,550	42,080	3¾ to 4⅞
8	34,343	37,250	1,900	32,350	71,500	3⅜ to 4¾
15	5,678	21,400	300	12,000	33,700	4⅛ to 5
22	4,247	12,750	700	5,500	18,950	3¾ to 5½
29	81,819	26,070	350	2,500	28,920	3¼ to 4⅞
April 5	44,288	38,500	2,450	9,500	50,450	3¼ to 4¾
12	10,324	34,700	3,130	8,700	46,530	3 to 5¼
19	72,405	31,910	2,500	7,500	41,910	3¾ to 4¾
26	28,224	41,290	1,060	30,100	72,450	3¼ to 5
May 3	88,718	20,720	900	29,600	51,220	3½ to 5¼
10	18,786	32,060	2,050	27,000	61,110	3⅜ to 5
17	51,476	18,800	1,400	5,200	25,400	3¼ to 4⅞
24	28,126	31,420	1,000	5,000	37,420	3⅛ to 4⅞
31	18,189	33,990	1,200	5,000	40,190	3¼ to 4⅞

STATEMENT—Continued.

1845.	No. of bags imported.	No. of bags taken by the trade.	No. of bags taken by exporters.	No. of bags taken by speculators.	Total No. of bags sold.	Weekly price of Uplands, 1845.
June 7	125,496	25,530	1,710	1,750	28,990	$3\frac{3}{8}$ to 5
14	98,667	31,770	3,100	9,000	43,870	$3\frac{1}{4}$ to 6
21	48,225	35,570	1,300	11,000	47,870	$3\frac{3}{4}$ to $5\frac{1}{8}$
28	12,388	26,090	2,780	11,900	40,770	$3\frac{1}{8}$ to $4\frac{3}{4}$
July 5	65,477	39,910	2,080	19,000	60,990	$3\frac{1}{4}$ to $4\frac{3}{4}$
12	45,623	35,370	2,750	26,900	65,020	$3\frac{1}{2}$ to $4\frac{3}{4}$
19	54,549	27,760	8,230	36,700	72,690	$3\frac{3}{8}$ to 5
26	24,151	31,510	4,420	10,850	46,780	$3\frac{1}{2}$ to $5\frac{7}{8}$
August 2	46,652	22,600	2,770	7,600	32,970	$3\frac{3}{8}$ to $5\frac{1}{8}$
9	11,252	24,860	3,700	8,400	36,960	$3\frac{1}{2}$ to $5\frac{3}{4}$
16	22,692	31,290	2,300	8,400	41,990	$3\frac{1}{2}$ to $5\frac{1}{4}$
23	6,884	23,480	3,160	5,400	32,040	$3\frac{1}{2}$ to $5\frac{1}{4}$
30	29,453	33,330	1,900	13,700	48,930	$3\frac{1}{2}$ to $4\frac{3}{4}$
Sept. 6	3,992	31,750	1,200	31,300	64,250	$3\frac{1}{2}$ to 5
13	4,262	18,530	450	14,000	32,980	$3\frac{3}{4}$ to 5
20	21,874	26,300	500	11,700	38,500	$3\frac{5}{8}$ to $5\frac{1}{4}$
27	9,981	19,100	800	6,500	26,400	$3\frac{7}{8}$ to $5\frac{1}{4}$
October 4	7,353	22,230	200	1,500	23,930	$3\frac{5}{8}$ to $4\frac{3}{4}$
11	3,815	13,550	700	2,500	16,750	$3\frac{3}{4}$ to $4\frac{7}{8}$
18	6,623	14,800	200	5,000	20,000	$3\frac{3}{4}$ to $4\frac{1}{8}$
25	10,109	12,840	-	4,500	17,340	$3\frac{3}{4}$ to $4\frac{3}{4}$
Nov. 1	16,948	12,420	150	5,500	18,070	$3\frac{3}{4}$ to $4\frac{5}{8}$
8	8,026	16,000	-	-	16,000	$3\frac{5}{8}$ to 5
15	13,950	23,560	-	12,000	35,560	$3\frac{1}{2}$ to $4\frac{1}{2}$
22	13,443	12,540	-	3,000	15,540	$3\frac{5}{8}$ to $4\frac{5}{8}$
29	37,641	25,370	-	12,500	37,870	$3\frac{1}{2}$ to $4\frac{5}{8}$
Dec. 6	23,852	24,960	-	500	25,460	$3\frac{1}{4}$ to $7\frac{1}{2}$
13	12,707	25,840	100	500	26,440	$3\frac{3}{8}$ to $4\frac{3}{8}$
20	15,746	19,730	-	700	20,430	3 to $4\frac{1}{2}$
27	24,616	22,120	100	1,300	23,520	$3\frac{3}{8}$ to $4\frac{1}{2}$

1st 3 months - -	5,354	Forwarded into the country by interior importers, and not accounted for in the sales.
2d 3 months - -	6,876	
3d 3 months - -	7,683	
4th 3 months - -	4,592	

We have selected the foregoing statistical tables from an English publication called "Burn's Glance." It is issued twice a year, and forms a most valuable sheet of reference to the merchant, manufacturer, importer, or exporter of goods, in proof of which we give the following:

WHITEHALL, *July* 27, 1843.

SIR: I am directed by Mr. W. E. Gladstone to return you his best thanks for the copy you have been so good as to send him of your very useful publication, which is now regularly taken in for the use of the Board of Trade.

I am, sir, your obedient servant,

STAFFORD H. NORTHCOTE.

It may be obtained of Messrs. Willmer & Rogers, European Times office, New York.

COTTON IN GERMANY.

"Our cotton business has again increased materially this year, and sales were—

In 1845	22,940 bales	All United States and Texas cotton.
1844	20,961 "	
1843	14,192 "	
1842	11,779 "	
1841	8,565 "	

"The imports into Hamburg were—

	Bales.	From U. States.	From West Indies and Brazil.	Indirect, East Indies and England.
In 1845	67,306	30,318	8,745	28,243
1844	64,997	19,179	7,306	38,512
1843	75,434	26,240	8,681	40,513
1842	60,895	12,705	10,746	37,444
1841	62,118	24,123	14,738	23,257

"An immense number of emigrants have left our place to seek your hospitable shores, and we expect to find the grand total about 32,000. They were embarked under the following colors: about 140 Bremen vessels, 50 American, and 12 other vessels; and, as far as known, have all safely reached their destination.

"We hope these remarks will prove of some interest to you; and in closing them, we beg to be allowed to sign as

"Your friend and servant."

VESSELS EMPLOYED IN THE FOREIGN TRADE OF THE UNITED KINGDOM.

An account of the number and tonnage of vessels, distinguishing the countries to which they belonged, which entered inwards and cleared outwards in the ten months ended 5th November, 1845, *compared with the entries and clearances of the corresponding ten months in the years* 1843 *and* 1844, *stated exclusively of vessels in ballast, and of those employed in the coasting trade between Great Britain and Ireland.*

COUNTRIES TO WHICH THE VESSELS BELONGED.	ENTERED INWARDS.						CLEARED OUTWARDS.					
	TEN MONTHS ENDED 5TH NOVEMBER,						TEN MONTHS ENDED 5TH NOVEMBER,					
	1843.		1844.		1845.		1843.		1844.		1845.	
	Ships.	Tonnage.	Ships.	Tonnage.	Ships.	Tonnage.	Ships.	Tonnage.	Ships.	Tonnage.	Ships.	Tonnage.
United Kingdom and its dependencies - -	11,248	2,360,831	12,215	2,541,862	12,981	2,992,875	13,119	2,327,081	12,283	2,247,191	12,748	2,546,502
Russia - - -	140	39,592	169	44,783	230	63,655	109	31,281	105	27,579	158	42,323
Sweden - - -	161	27,873	231	29,426	268	37,472	182	26,635	193	27,083	254	34,940
Norway - - -	633	99,360	818	137,065	1,021	157,111	303	34,329	335	39,738	480	57,015
Denmark - - -	823	56,785	1,365	99,883	779	57,115	1,270	95,415	1,294	97,504	1,376	107,160
Prussia - - -	764	147,952	1,025	192,111	1,083	209,158	779	143,137	691	121,688	886	152,880
Other German States -	589	53,881	884	75,504	948	82,975	1,004	87,958	939	88,064	1,274	119,097
Holland - - -	382	34,493	472	39,310	665	51,675	486	48,177	538	50,525	761	68,836
Belgium - - -	187	28,473	237	35,186	219	29,248	243	39,203	299	44,655	309	42,863
France - - -	496	24,551	494	27,973	631	28,911	928	76,952	1,017	87,540	1,751	141,004
Spain - - -	51	7,639	53	7,178	69	10,083	58	7,552	78	10,512	83	10,470
Portugal - - -	18	2,587	24	2,332	28	3,052	17	2,203	21	2,151	25	2,820
Italian States - -	34	9,501	47	11,822	115	30,395	52	13,401	55	15,963	130	32,736
Other European States -	6	1,236	-	-	8	1,959	8	1,829	-	-	7	2,017
United States of America -	678	362,310	515	299,304	601	356,138	536	295,066	498	298,352	605	360,692
Other States in America, Africa, or Asia - -	-	-	5	865	7	2,710	2	574	3	501	7	1,830
Total -	16,210	3,257,064	18,554	3,544,604	19,653	4,114,532	19,096	3,230,793	18,349	3,159,046	20,854	3,723,185

From Willmer and Smith's European Times of February 4.

PROPOSED REDUCTION IN THE BRITISH TARIFF.

The following tables show the changes which the British ministers intend to propose in the British tariff:

DUTY FREE.

Resolved, That the duties of customs chargeable upon the goods, wares, and merchandise hereafter mentioned, imported into the United Kingdom, shall cease and determine, viz:

Animals, living, viz: asses, goats, kids, oxen, bulls, cows and calves, horses, mares, geldings, colts, foals, mules, sheep, lambs, swine and hogs, pigs, sucking; bacon; beef, fresh or slightly salted; beef, salted, not being corned beef; bottles of earth and stone, empty; casts of busts, statues, or figures; caviare; cranberries; cotton manufactures, not being articles wholly or in part made up, and not otherwise charged with duty; enamel; gelatine; glue; hay; hides, or pieces thereof, tawed, curried, or in any way dressed, not otherwise enumerated; ink for printers; inkle, wrought; lamp-black; linen, manufactures of linen, or of linen mixed with cotton or with wool, not particularly enumerated or otherwise charged with duty, not being articles wholly or in part made up; magna græcia ware; manuscripts; maps and charts, or parts thereof, plain or colored; mattresses; meat, salted or fresh, not otherwise described; medals, of any sort; palmetto; thatch manufactures; parchment; pens; plantains; potatoes; pork, fresh; pork, salted, not hams; silk, thrown, dyed, viz: silk singles or tram, organzine, or crape silk; telescopes; thread, not otherwise enumerated or described; woolens, viz: manufactures of wool, not being goats' wool, or of wool mixed with cotton, not particularly enumerated or described, not otherwise charged with duty, not being articles wholly or in part made up; vegetables, all not otherwise enumerated or described; vellum.

CORN.

Resolved, That in lieu of the duties now payable on the importation of corn, grain, meal, or flour, there shall be paid, until the 1st day of February, 1849, the following duties, viz:

If imported from any foreign country:

Wheat.—Whenever the average price of wheat, made up and published in the manner required by law, shall be, for every quarter,

	s.	d.
Under 48*s*., the duty shall be for every quarter	10	0
48*s*. and under 49*s*.	9	0
49*s*. and under 50*s*.	8	0
50*s*. and under 51*s*.	7	0
51*s*. and under 52*s*.	6	0
52*s*. and under 53*s*.	5	0
53*s*. and upwards	4	0

Barley, beer, or bigg.—Whenever the average price of barley, made up and published in the manner required by law, shall be, for every quarter,

	s.	d.
Under 26*s*., the duty shall be, for every quarter	5	0
26*s*. and under 27*s*.	4	6

	s. d.
27*s*. and under 28*s*.	4 0
28*s*. and under 29*s*.	3 6
29*s*. and under 30*s*.	3 0
30*s*. and under 31*s*.	2 6
31*s*. and upwards	2 0

Oats.—Whenever the average price of oats, made up and published in the manner required by law, shall be, for every quarter,

Under 18*s*., the duty shall be, for every quarter	4 0
18*s*. and under 19*s*.	3 6
19*s*. and under 20*s*.	3 0
20*s*. and under 21*s*.	2 6
21*s*. and under 22*s*.	2 0
22*s*. and upwards	1 6

Rye, peas, and beans.—For every quarter, a duty equal in amount to the duty payable on a quarter of barley.

Wheat, meal, and flour.—For every barrel, being one hundred and ninety-six pounds, a duty equal in amount to the duty payable on thirty-eight gallons and a half of wheat.

Barley meal.—For every quantity of —— pounds, a duty equal in amount to the duty payable on a quarter of barley.

Oatmeal.—For every quantity of one hundred and eighty-one pounds and a half, a duty equal in amount to the duty payable on a quarter of oats.

Rye meal.—For every quantity of —— pounds, a duty equal in amount to the duty payable on a quarter of rye.

Pea meal and bean meal.—For every quantity of —— pounds, a duty equal in amount to the duty payable on a quarter of peas or beans.

And that from and after the said 1st day of February, 1849, there shall be paid the following duties, viz:

	s. d.
Wheat, barley, beer or bigg, oats, rye, peas, and beans, for every quarter	1 0
Wheat meal, barley meal, oatmeal, rye meal, pea meal, and bean meal, for every hundred weight	0 4½
If the produce of and imported from any British possession out of Europe:	
Wheat, barley, beer or bigg, oats, rye, peas, and beans, the duty shall be for every quarter	1 0
Wheat meal, barley meal, oatmeal, rye meal, pea meal, and bean meal, the duty shall be for every hundred weight	0 4½

MISCELLANEOUS.

Resolved, That in lieu of the duties of customs now chargeable on the articles under-mentioned, imported into the United Kingdom, the following duties shall be charged, viz:

	£	s.	d.
Agates or cornelians, set, for every £100 value	10	0	0
Ale and beer of all sorts, for every barrel	1	0	0
Almonds, paste of, for every £100 value	10	0	0
Amber, manufactures of, not enumerated, for every £100 value	10	0	0

	£	s.	d.
Arrowroot, the cwt. - - - - - - -	0	2	6
of and from a British possession, per cwt. -	0	0	6
Bandstring twist, for every £100 value - - -	10	0	0
of and from a British possession, for every £100 value - - - - - -	5	0	0
Barley, pearled, the cwt. - - - - -	0	2	6
of and from a British possession, per cwt. - -	0	1	3
Bast-ropes, twines, and strands, for every £100 value -	10	0	0
of and from a British possession, for every £100 value -	5	0	0
Beads, viz:			
Arango, for every £100 value - - -	10	0	0
Coral, for every £100 value - - - -	10	0	0
Crystal, for every £100 value - - -	10	0	0
Jet, for every £100 value - - - -	10	0	0
not otherwise enumerated or described - -	10	0	0
Beer or mum, the barrel - - - - -	1	0	0
Blacking, for every £100 value - - - -	10	0	0
Brass, manufactures of, for every £100 value - -	10	0	0
powder of, for every £100 value - - -	10	0	0
Brocade, of gold or silver, for every £100 value - -	10	0	0
Bronze, manufactures of, for every £100 value - -	10	0	0
powder, for every £100 value - - -	10	0	0
Buckwheat, the quarter - - - - -	0	1	0
Butter, per cwt. - - - - - -	0	10	0
of and from a British possession, the cwt. - -	0	2	6
Buttons, metal, for every £100 value - - -	10	0	0
Candles, viz:			
Spermaceti, the lb. - - - - -	0	0	3
Stearine, the lb. - - - - -	0	0	1¼
Tallow, the cwt. - - - - -	0	5	0
Wax, the lb. - - - - -	0	0	2
Canes—walking-canes or sticks, mounted, painted, or otherwise ornamented, for every £100 value - - -	10	0	0
Carriages of all sorts, for every £100 value - - -	10	0	0
Casks, empty, for every £100 value - - - -	10	0	0
Cassiva powder, the cwt. - - - - -	0	2	6
of and from a British possession, the cwt. - -	0	0	6
Catlings, for every £100 value - - - -	10	0	0
Cheese, the cwt. - - - - - -	0	5	0
of and from a British possession, the cwt. - -	0	1	6
China or porcelain ware, painted or plain, gilt or ornamented, for every £100 value - - - - -	10	0	0
Cider, the tun - - - - - -	5	5	0
Citron, preserved in salt, for every £100 value - -	5	0	0
Clocks, for every £100 value - - - - -	10	0	0
Copper manufactures, not otherwise enumerated or described, and copper plates engraved, for every £100 value - -	10	0	0
Copper or brass wire, for every £100 value - - -	10	0	0
Cotton—articles or manufactures of cotton, wholly or in part made up, not otherwise charged with duty, for every £100 value - - - - - - -	10	0	0

	£	s.	d.
Cotton, of and from a British possession, for every £100 value	5	0	0
Crayons, for every £100 value - - - -	10	0	0
Crystal, cut or manufactured, for every £100 value - -	10	0	0
Cucumbers, preserved, for every £100 value - - -	5	0	0
of and from a British possession, £100 value -	2	10	0
Fish, cured, not otherwise enumerated, the cwt. - -	0	1	0
Gauze, of thread, for every £100 value - - -	10	0	0
of and from a British possession, for every £100 value	5	0	0
Hair—manufactures of hair or goats' wool, or of hair or goats' wool and any other material, and articles of such manufacture wholly or in part made up, not particularly enumerated, or otherwise charged with duty, for every £100 value - - - -	10	0	0
of and from a British possession, for every £100 value	5	0	0
Hams of all kinds, the cwt. - - - - -	0	7	0
of and from a British possession, the cwt. - -	0	2	0
Harp-strings, or lute-strings, silvered, for every £100 value -	10	0	0
Hats or bonnets, viz:			
of chip, the lb. - - - - - -	0	3	6
of bast, cane, or horse-hair hats or bonnets, each hat or bonnet not exceeding twenty-two inches in diameter, the dozen - - - - - -	0	7	6
Each hat or bonnet exceeding twenty-two inches diameter, the dozen - - - - - -	0	10	0
Straw hats or bonnets, the lb. - - - -	0	5	0
Hats—felt, hair, wool, or beaver hats, each - - -	0	2	0
made of silk, silk shag laid upon felt, linen, or other material, each - - - - -	0	2	5
Hops, the cwt. - - - - - -	2	5	0
Iron and steel, wrought, not otherwise enumerated, for every £100 value - - - - - -	10	0	0
Japanned or lacquered ware, for every £100 value - -	10	0	0
Lace thread, for every £100 value - - - -	10	0	0
made by the hand, commonly called cushion or pillow-lace, whether of linen, cotton, or silken thread, for every £100 value - - - - -	10	0	0
Latten wire, for every £100 value - - - -	10	0	0
Lead, manufactures of, not otherwise enumerated, for every £100 value - - - - - -	10	0	0
Leather, manufactures of—boots, shoes, and goloshes, viz:			
Women's boots and goloshes, the dozen pair - -	0	6	0
Women's boots and goloshes, if lined or trimmed with fur or other trimming, the dozen pair - -	0	7	6
Women's shoes, with cork or double soles, quilted shoes and clogs, the dozen pair - - -	0	5	0
Women's shoes, if trimmed or lined with fur or any other trimming, the dozen pair - - -	0	6	0
Women's shoes, of silk, satin, jean, or other stuffs, kid, morocco, or other leather, the dozen pair -	0	4	6
Women's shoes, if trimmed or lined with fur or any other trimming, the dozen pair - - -	0	5	0

	£	s.	d.
Leather, manufactures of—			
Girls' boots, shoes, and goloshes, not exceeding seven inches in length, to be charged with two-thirds of the above duties.			
Men's boots, the dozen pair - - - -	0	14	0
Men's shoes, the dozen pair - - - -	0	7	0
Boys' boots and shoes, not exceeding seven inches in length, to be charged with two-thirds of the above duties.			
Leather boot-fronts, not exceeding six inches in height, the dozen pair - - - - - - -	0	1	9
Leather boot-fronts, exceeding nine inches in height, the dozen pair - - - - - - -	0	2	9
Leather cut into shapes, or any other article made of leather, or any manufacture whereof leather is the most valuable part, not otherwise enumerated or described, for every £100 value	10	0	0
Linen, or linen and cotton, viz:			
Cambrics and lawns, commonly called French lawns, the piece not exceeding eight yards in length, and not exceeding seven-eighths of a yard in breadth, and so in proportion for any greater or less quantity, plain, the piece - - - - -	0	2	6
Bordered handkerchief, the piece - - -	0	2	6
Lawns of any sort, not French, £100 value - -	10	0	0
Damasks, the square yard - - - -	0	0	5
Damask diaper, the square yard - - -	0	0	2½
Plain linen and diaper, not otherwise enumerated or described, and whether chequered or striped with dye, yarn, or not, for every £100 value - -	10	0	0
Sails, not in actual use of a British ship, and fit and necessary for such ship, and not otherwise disposed of, for every £100 value - - - -	10	0	0
Articles, manufactures of linen, or of linen mixed with cotton, or with wool, wholly or in part made up, not particularly enumerated, or otherwise charged with duty, for every £100 value - - - -	10	0	0
Maize, or Indian corn, per quarter - - - -	0	1	0
meal, the cwt. - - - - -	0	0	6
Musical instruments, for every £100 value - - -	10	0	0
Mustard flour, the cwt. - - - - -	0	6	0
Paper, printed, painted or stained, or paper hangings, or flock paper, the square yard - - - - -	0	0	2
Pencils, for every £100 value - - - -	10	0	0
of slate, for every £100 value - - -	10	0	0
Perfumery, not otherwise charged, for every £100 value -	10	0	0
Perry, the tun - - - - - - -	5	5	0
Pewter, manufactures of, for every £100 value - -	10	0	0
Platting of straw, the lb. - - - - -	0	5	0
Pomatum, for every £100 value - - - -	10	0	0
Pots of stone, for every £100 value - - - -	10	0	0
Rice, the cwt. - - - - - - -	0	1	0
rough, and in the husk, the quarter - - -	0	1	0

	£	s.	d.
Sago, the cwt.	0	0	6
Sausages or puddings, the lb.	0	0	1
Seeds, viz: Canary, the cwt.	0	5	0
Carraway, the cwt.	0	5	0
Carrot, the cwt.	0	5	0
Onions, the cwt.	0	5	0
Clover, the cwt.	0	5	0
Leek, the cwt.	0	5	0
Mustard, the cwt.	0	1	3
All other seeds not particularly enumerated or described, or otherwise charged with duty, for every £100 value	5	0	0
These seeds of and from a British possession, to be charged only one-half of these duties.			
Silk manufactures—Manufactures of silk, or of silk mixed with metal, or any other material, produce of Europe, viz: silk or satin, plain, striped, figured, or brocaded, viz:			
Broad stuffs, the lb.	0	5	0
Articles thereof not otherwise enumerated, the lb.	0	6	0
Or, and at the option of the officers of the customs, for every £100 value	15	0	0
Ribbons, the lb.	0	6	0
Silk gauze or crape, plain, striped, figured, or brocaded, viz:			
Broad stuffs, the lb.	0	9	0
Articles thereof, not otherwise enumerated, the lb.	0	10	0
Or, and at the option of the officers of the customs, for every £100 value	15	0	0
Ribbons, the lb.	0	11	0
Gauze of all descriptions, mixed with silk, satin, or any other materials, in the proportion of one-half part of the fabrics, the lb.	0	9	0
Articles thereof not otherwise enumerated, the lb.	0	9	0
Or, and at the option of the officers of the customs, for every £100 value	15	0	0
Velvet, plain or figured, the lb.	0	9	0
Articles thereof, not otherwise enumerated, the lb.	0	10	0
Or, and at the option of the officers of the customs, for every £100 value	15	0	0
Ribbons of silk, embossed, or figured with velvet, the lb.	0	9	0
Manufactures of silk, or of silk and any other material called plush, commonly used for making hats, the lb.	0	2	0
Fancy silk net, or tricot, the lb.	0	8	0
Plain silk lace, or net, called tulle, the lb.	0	8	0
Manufactures of silk, or silk mixed with any other materials, not particularly enumerated, or otherwise charged with duty, for every £100 value	15	0	0
Millinery, of silk, or of which the greater part of the materials is silk, viz:			
Turbans or caps, each	0	3	6
Hats or bonnets, each	0	7	0
Dresses, each	1	10	0

	£	s.	d.
Manufactures of silk, or of silk and any other materials, and articles of the same wholly or partially made up, not particularly enumerated or otherwise charged with duty, for every £100 value - - - - -	15	0	0
Silk worm gut, for every £100 - - - -	10	0	0
Skins, articles manufactured of skins, or furs, £100 value -	10	0	0
Soap, hard, the cwt. - - - - -	1	0	0
of and from a British possession, the cwt. -	0	14	0
Soft, the cwt. - - - - -	0	14	0
of and from a British possession, the cwt. -	0	10	0
Naples, the cwt. - - - - -	1	0	0
Spaware, for every £100 value - - - -	10	0	0
Spirits, viz: brandy, Geneva, and other foreign spirits, not being spirits or strong waters the produce of any British possession in America, or any British possession within the limits of the East India Company's charter, and not being sweetened spirits or spirits mixed with any article, so that the degree of strength thereof cannot be exactly ascertained by such hydrometer, the gallon - - - -	0	15	0
Steel, manufactures of, for every £100 value - -	10	0	0
Tallow, the cwt. - - - - - - -	0	1	6
of and from a British possession, the cwt. - -	0	0	1
Tapioca, the cwt. - - - - - -	0	0	6
Tin, manufactures of, not otherwise enumerated, for every £100 value - - - - - -	10	0	0
Tobacco pipes of clay, every £100 value - - -	10	0	0
Tongues, the cwt. - - - - - -	0	7	0
of and from a British possession, the cwt. - -	0	2	0
Turnery, not otherwise described, for every £100 value -	10	0	0
Twine, for every £100 value - - - -	10	0	0
of and from a British possession, every £100 value -	5	0	0
Varnish, not otherwise described, for every £100 value -	10	0	0
Wafers, for every £100 value - - - -	10	0	0
Washing balls, the cwt. - - - - -	1	0	0
Wax, sealing wax, for every £100 value - - -	10	0	0
Whipcord, for every £100 value - - - -	10	0	0
Wire, gilt or plated, or silver, for every £100 value - -	10	0	0
Woolens, articles or manufactures or wool, not being goats' wool, or of wool mixed with cotton, wholly or in part made up, not otherwise charged with duty, for every £100 value	10	0	0
of and from a British possession, every £100 value	5	0	0
Goods, wares, and merchandise, being either in part or wholly manufactured, and not being enumerated or described, not otherwise charged with duty, and not prohibited to be imported into or used in Great Britain or Ireland, for every £100 value - - - - - -	10	0	0

Sugar.—The produce of free labor to be admitted at a differential duty of 3*s.* 6*d.* per cwt. less than before; thus the duty on Muscovado will be reduced from 9*s.* 4*d.* to 5*s.* 10*d.*, and on clayed sugar from 11*s.* 8*d.* to 8*s.* 2*d.*, or 8*s.* per cwt.

Table exhibiting the quantities and value of the products of agriculture, and articles manufactured of agricultural products, exported from and imported into the United States for a series of years, commencing October, 1830, and ending June 30, 1845, inclusive.

			From October 1, 1830, to September 30, 1831.			
			Exports.		Imports.	
			Quantity.	Value.	Quantity.	Value.
1	Animals for breed and other	-	-	-	-	$18,563
2	Apples	barrels	16,375	$31,148		
3	Ashes, pot and pearl	tons	10,219	935,613		
4	Bacon, hams and other	pounds	1,477,446	-	27,757	2,506
5	Bark, oak	-	-	99,116		
6	Barley	-				
7	Beef	barrels	60,770	-	*335,922	6,690
8	Butter	pounds	1,728,212	264,796	746	104
9	Cheese	do	1,131,817		59,739	7,277
10	Corn, Indian	bushels	571,312	396,617		
11	meal	barrels	207,604	595,434		
12	Cotton, unmanufactured	pounds	276,979,784	25,289,492	345,459	33,475
13	manufactured	-	-	1,126,313	-	16,090,224
14	bagging	sq. yards	-	-	207,906	18,966
15	Flax, manufactured	-	-	2,830	-	3,898,353
16	unmanufactured	cwt.	-	-	463	6,472
17	Flaxseed	bushels	120,702	216,376		
18	Flour	barrels	1,806,529	9,938,458	500 lbs.	14
19	Hemp, unmanufactured	cwt.	-	-	51,909	295,706
20	manufactured	-	-	-	-	988,153
21	Hides and skins	No.	299,473	†829,982	-	3,057,543
22	Hogs	do	14,690	‡1,501,644		
23	Hops	pounds	265,043	26,664		
24	Horses and mules	No.	2,724	218,015		
25	Horned cattle	do	§5,881			
26	Indigo	pounds	-	-	803,252	759,012

27	Lard (see hogs)	do	6,963,516	- -	5,778	451
28	Oats, rye, pulse, &c.	bushels	- -	132,717	1,226	333
29	Oil, linseed	gallons	8,643	- -	118,556	
30	Potatoes	bushels	112,875	41,147	24,521	7,818
31	Pork (see beef)	barrels	51,263			
32	Rice	tierces	116,517	2,016,267		
33	Rosin and turpentine	barrels	156,319	‖397,687		
34	Rye meal	do	19,100	71,881		
35	Silk, raw and manufactured		- -	- -	- -	10,992,950
36	Starch	pounds				
37	Soap	do	5,752,430	¶643,252	163,170	9,640
38	Sugar	do	2,237,619	225,899	109,231,168	4,931,824
39	Tallow	do	679,623	- -	149,667	10,266
40	candles (see soap)	do	2,669,211	- -	22,774	1,559
41	Tar and pitch (see rosin)	barrels	52,995			
42	Tobacco	hogsheads	86,718	4,892,388		
43	manufactured	pounds	3,667,823	292,475	4,150	2,389
44	Wax	do	430,929	114,017		
45	Wheat	bushels	408,910	523,270	620	685
46	Wool, unmanufactured	pounds				

* Including pork in imports. † Including horned cattle in the valuation. ‡ Including pork, bacon, and lard. § Valued with hides.
‖ Including tar and pitch. ¶ Including tallow candles.

TABLE—Continued.

			From October 1, 1831, to September 30, 1832.			
			Exports.		Imports.	
			Quantity.	Value.	Quantity.	Value.
1	Animals for breed and other		-	-	-	$24,451
2	Apples	barrels	6,928	$15,314		
3	Ashes, pot and pearl	tons	8,859	930,398		
4	Bacon, hams and other	pounds	1,810,830	-	24,305	2,204
5	Bark, oak		-	52,944		
6	Barley					
7	Beef	barrels	55,507	-	90,837	*2,115
8	Butter	pounds	1,501,686	290,820	3,666	592
9	Cheese	do	1,391,853		198,709	20,073
10	Corn, Indian	bushels	451,230	278,740		
11	meal	barrels	146,710	480,035		
12	Cotton, unmanufactured	pounds	322,215,122	31,724,682	442,688	34,520
13	manufactured		-	-	-	10,399,653
14	bagging	sq. yards	-	-	803,489	87,966
15	Flax, manufactured		-	-	-	4,193,607
16	unmanufactured	cwt.	-	-	1,837	16,194
17	Flaxseed	bushels	57,537	123,036		
18	Flour	barrels	864,919	4,880,623	900 lbs.	29
19	Hemp, unmanufactured	cwt.	-	-	150,739	866,865
20	manufactured		-	-		796,461
21	Hides and skins	No.	52,110	†774,087	-	4,680,128
22	Hogs	do	5,266	‡1,928,196	-	
23	Hops	pounds	184,729	25,448		
24	Horses and mules	No.	2,926	164,034		
25	Horned cattle	do	§8,123			
26	Indigo	pounds	-	-	1,114,827	978,179
27	Lard (see hogs)	do	7,756,782	-	723	41
28	Oats, rye, pulse, &c.	bushels	-	78,447	1,187	331
29	Oil, linseed	gallons	4,495	-	719,898	

30	Potatoes	bushels	106,517	42,077	45,816	18,436
31	Pork (see beef)	barrels	88,625	– –	90,837 lbs.	‖2,115
32	Rice	tierces	120,327	2,152,631		
33	Rosin and turpentine	barrels	168,770	¶ 476,291		
34	Rye meal	do	17,254	75,392		
35	Silk, raw and manufactured	-	– –	– –	– –	9,143,504
36	Starch	pounds				
37	Soap	do	5,743,602	** 701,184	768,645	46,695
38	Sugar	do	856,022	85,905	66,488,991	2,936,619
39	Tallow	do	622,522	– –	225,920	12,445
40	candles (see soap)	do	2,498,776	– –	174,631	12,235
41	Tar and pitch (see rosin)	barrels	47,523			
42	Tobacco	hogsheads	106,806	5,999,769		
43	manufactured	pounds	3,487,246	295,771	2,685	890
44	Wax	do	258,559	62,444		
45	Wheat	bushels	88,304	93,500	1,168	1,151
46	Wool, unmanufactured	pounds	– –	– –	4,042,838	698,721

* Including pork in imports. † Including horned cattle in the valuation. ‡ Including pork, bacon, and lard. § Valued with hides.
‖ Including beef. ¶ Including tar and pitch. ** Including tallow candles.

TABLE—Continued.

			From October 1, 1832, to September 30, 1833.			
			Exports.		Imports.	
			Quantity.	Value.	Quantity.	Value.
1	Animals for breed and other	-	-	-	-	$70,102
2	Apples	barrels	17,075	$33,262		
3	Ashes, pot and pearl	tons	11,052	814,398		
4	Bacon, hams and other	pounds	1,786,637	-	14,881	1,691
5	Bark, oak	-	-	93,609		
6	Barley	-				
7	Beef	barrels	64,322	-	379,270	11,748
8	Butter	pounds	1,346,364	} 258,452	} 2,758	381
9	Cheese	do	1,213,092		237,315	23,832
10	Corn, Indian	bushels	487,174	337,505		
11	meal	barrels	146,678	534,309		
12	Cotton, unmanufactured	pounds	324,698,604	36,191,105	471,748	46,850
13	manufactured	-	-	2,557,466	-	8,111,053
14	bagging	sq. yards	-	-	1,421,185	158,681
15	Flax, manufactured	-	-	24,949	-	3,132,577
16	unmanufactured	cwt.	-	-	996	8,656
17	Flaxseed	bushels	117,292	228,300		
18	Flour	barrels	955,768	5,613,010	3,700 lbs.	110
19	Hemp, unmanufactured	cwt.	-	-	94,026	470,973
20	manufactured	-	-	-	-	1,544,663
21	Hides and skins	No.	58,179	*958,076	-	3,588,819
22	Hogs	do	6,819	†2,151,558		
23	Hops	pounds	468,798	92,963		
24	Horses and mules	No.	3,051	167,330		
25	Horned cattle	do	16,837			
26	Indigo	pounds	300	180	1,140,454	986,402
27	Lard (see hogs)	do	7,655,198			
28	Oats, rye, pulse, &c.	bushels	-	102,568	348	110
29	Oil, linseed	gallons	3,159	-	738,751	

30	Potatoes	bushels	136,127	52,052	51,395	18,356
31	Pork (see beef)	barrels	105,870	- -	379,270 lbs.	11,748
32	Rice	tierces	144,163	2,744,418		
33	Rosin and turpentine	barrels	176,146	§483,712		
34	Rye meal	do	36,038	140,017		
35	Silk, raw and manufactured		- -	- -	- -	9,309,097
36	Starch	pounds				
37	Soap	do	5,537,161	‖673,076	118,440	7,997
38	Sugar	do	517,076	47,962	97,734,438	4,755,856
39	Tallow	do	676,841	- -	1,346,238	83,209
40	candles (see soap)	do	2,410,385	- -	47,239	3,225
41	Tar and pitch (see rosin)	barrels	41,024			
42	Tobacco	hogsheads	83,153	5,755,968		
43	manufactured	pounds	3,803,763	288,973	- -	485,017
44	Wax	do	783,843	178,748		
45	Wheat	bushels	32,221	29,592	1,600	1,606
46	Wool, unmanufactured	pounds	- -	- -	950,205	240,892

* Including horned cattle in the valuation. † Including pork, bacon, and lard. ‡ Valued with hides. § Including tar and pitch.
‖ Including tallow candles.

TABLE—Continued.

			From October 1, 1833, to September 30, 1834.			
			Exports.		Imports.	
			Quantity.	Value.	Quantity.	Value.
1	Animals for breed and other	-	- -	- -	- -	$116,054
2	Apples	barrels	25,276	$41,849		
3	Ashes, pot and pearl	tons	6,481	557,500		
4	Bacon, hams and other	pounds	1,520,638	- -	29,950	3,189
5	Bark, oak	-	- -	71,747		
6	Barley	-				
7	Beef	barrels	46,181	*755,219	1,196,009 lbs.	37,102
8	Butter	pounds	1,084,960	190,099	4,072	485
9	Cheese	do	819,567		193,213	22,234
10	Corn, Indian	bushels	303,449	203,573		
11	meal	barrels	149,609	491,910		
12	Cotton, unmanufactured	pounds	384,717,907	49,448,402	604,616	51,982
13	manufactured	-	- -	2,083,994	- -	10,145,181
14	bagging	sq. yards	- -	- -	1,962,920	237,260
15	Flax, manufactured	-	- -	11,051	- -	786,891
16	unmanufactured	cwt.				
17	Flaxseed	bushels	187,468	281,990		
18	Flour	barrels	835,352	4,520,781	3,200 lbs.	81
19	Hemp, unmanufactured	cwt.	- -	- -	102,211	514,743
20	manufactured	-	- -	- -	- -	894,677
21	Hides and skins	No.	60,015			
22	Hogs	do	3,338			
23	Hops	pounds	917,600	164,577		
24	Horses and mules	No.	3,954	233,554		
25	Horned cattle	do	6,441			
26	Indigo	pounds	102	148	921,894	999,863
27	Lard (see hogs)	do	9,050,342	- -	1,031	90
28	Oats, rye, pulse, &c.	bushels	- -	49,465	1,807	506
29	Oil, linseed	gallons	15,728	- -	507,790	315,972

30	Potatoes	bushels	97,427	38,567	41,927	15,942
31	Pork (see beef)	barrels	82,691			
32	Rice	tierces	121,886	2,122,272		
33	Rosin and turpentine	barrels	172,391	525,390		
34	Rye meal	do	39,151	140,306		
35	Silk, raw and manufactured	-	-	-	-	2,688,055
36	Starch	pounds				
37	Soap	do	4,327,602	†616,692	297,414	18,637
38	Sugar	do	2,463,841	225,614	115,392,096	5,538,102
39	Tallow	do	771,239	-	1,104,029	75,580
40	candles (see soap)	do	2,950,301	-	120,337	10,901
41	Tar and pitch (see rosin)	barrels	49,792			
42	Tobacco	hogsheads	87,979	6,595,305		
43	manufactured	pounds	4,013,405	328,409	-	672,150
44	Wax	do	364,674	86,803		
45	Wheat	bushels	36,948	39,598	1,225	1,213
46	Wool, unmanufactured	pounds	-	-	591,313	317,925

* Including beef, tallow, hides, and horned cattle in the valuation. † Including tallow candles.

TABLE—Continued.

			From October 1, 1834, to September 30, 1835.			
			Exports.		Imports.	
			Quantity.	Value.	Quantity.	Value.
1	Animals for breed, and other		- -	- -	- -	$142,203
2	Apples	barrels	9,745	$20,959		
3	Ashes, pot and pearl	tons	6,448	571,591		
4	Bacon, hams and other	pounds	1,492,027	- -	65,625	5,739
5	Bark, oak		- -	73,877		
6	Barley					
7	Beef	barrels	38,028	*638,761	1,334,460	49,321
8	Butter	pounds	684,624	164,809	3,077	425
9	Cheese	do	887,000		144,475	17,203
10	Corn, Indian	bushels	755,781	588,276		
11	meal	barrels	166,782	629,389		
12	Cotton, unmanufactured	pounds	387,358,992	64,961,302	1,759,402	268,301
13	manufactured		- -	2,858,681	- -	16,630,783
14	bagging	sq. yards	- -	- -	7,054,789	924,036
15	Flax, manufactured		- -	2,370	- -	539,453
16	unmanufactured	cwt.				
17	Flaxseed	bushels	228,863	451,886		
18	Flour	barrels	779,396	4,394,777	28,483 cwt.	69,976
19	Hemp, unmanufactured	cwt.	- -	- -	102,163	528,981
20	manufactured		- -	- -	- -	867,858
21	Hides and skins	No.	41,495	- -	- -	3,369,888
22	Hogs	do	3,930	†1,776,732		
23	Hops	pounds	625,684	90,720		
24	Horses and mules	No.	4,716	285,028		
25	Horned cattle	do	7,348			
26	Indigo	pounds	1,031	1,060	935,675	893,090
27	Lard (see hogs)	do	10,637,490			
28	Oats, rye, pulse, &c.	bushels	- -	- -	7,460	2,421
29	Oil, linseed	gallons	- -	- -	562,675	426,632

30	Potatoes	bushels	83,823	41,543	206,606	57,901
31	Pork (see beef)	barrels	61,827			
32	Rice	tierces	110,851	2,210,331		
33	Rosin and turpentine	barrels	170,282	‡567,566		
34	Rye meal	do	30,854	129,140		
35	Silk, raw and manufactured	-	- -	- -	- -	16,608,698
36	Starch	pounds				
37	Soap	do	3,708,101	§534,467	477,982	36,218
38	Sugar	do	870,506	70,819	126,038,333	6,806,425
39	Tallow	do	491,412	- -	359,744	22,713
40	candles (see soap)	do	2,503,883	- -	43,000	3,920
41	Tar and pitch (see rosin)	barrels	51,248			
42	Tobacco	hogsheads	94,353	8,250,577		
43	manufactured	pounds	3,854,325	357,611	- -	838,120
44	Wax	do	375,061	93,919		
45	Wheat	bushels	47,762	51,405	238,769	198,647
46	Wool, unmanufactured	pounds				

* Including beef, tallow, hides, and horned cattle in the valuation. † Including pork, bacon, and lard. ‡ Including tar and pitch.
§ Including tallow candles.

TABLE—Continued.

			From October 1, 1835, to September 30, 1836.			
			Exports.		Imports.	
			Quantity.	Value.	Quantity.	Value.
1	Animals for breed, and other		- -	- -	- -	$192,666
2	Apples	barrels	22,235	$39,668		
3	Ashes, pot and pearl	tons	6,003	723,606		
4	Bacon, hams and other	pounds	1,398,475	- -	173,945	16,244
5	Bark, oak		- -	68,758		
6	Barley					
7	Beef	barrels	50,226	*699,116	75,311	4,226
8	Butter	pounds	361,395	114,033	168,013	20,670
9	Cheese	do	486,234		191,602	23,796
10	Corn, Indian	bushels	124,791	103,702		
11	meal	barrels	140,917	621,560		
12	Cotton, unmanufactured	pounds	423,631,307	71,284,925	1,617,390	255,312
13	manufactured		- -	2,255,734	- -	17,876,087
14	bagging	sq. yards	- -	- -	13,203,095	1,701,451
15	Flax, manufactured		- -	- -	- -	1,035,680
16	unmanufactured	cwt.				
17	Flaxseed	bushels	123,926	250,182		
18	Flour	barrels	505,400	3,572,599	66,731	62,341
19	Hemp, unmanufactured	cwt.	- -	- -	147,190	815,558
20	manufactured		- -	- -	- -	717,101
21	Hides and skins	No.	39,379	- -	- -	3,511,463
22	Hogs	do	1,231	†1,383,344		
23	Hops	pounds	207,548	25,886		
24	Horses and mules	No.	5,428	346,689		
25	Horned cattle	do	4,683			
26	Indigo	pounds	1,065	1,020	1,236,902	1,113,577
27	Lard (see hogs)	do	6,493,878	- -	210,073	27,631
28	Oats, rye, pulse, &c.	bushels	- -	80,492	161,552	63,346
29	Oil, linseed	gallons	1,785	- -	710,291	535,036

30	Potatoes	bushels	91,581	43,630	80,251	31,614
31	Pork (see beef)	barrels	22,550			
32	Rice	tierces	212,983	2,548,750		
33	Rosin and turpentine	barrels	216,418	‡912,376		
34	Rye meal	do	36,646	173,976		
35	Silk, raw and manufactured	-	- -	- -	- -	22,899,684
36	Starch	pounds				
37	Soap	do	2,796,110	§478,310	572,737	43,071
38	Sugar	do	1,571,108	177,991	10,184,868	891,019
39	Tallow	do	443,765	- -	130,022	8,634
40	candles (see soap)	do	2,275,943	- -	62,717	5,425
41	Tar and pitch (see rosin)	barrels	49,433			
42	Tobacco	hogsheads	109,442	10,058,640		
43	manufactured	pounds	3,292,693	435,464	- -	1,064,112
44	Wax	do	311,807	91,676		
45	Wheat	bushels	2,062	2,062	583,898	493,159
46	Wool, unmanufactured	pounds	- -	- -	12,687,621	1,270,126

* Including beef, tallow, hides, and horned cattle in the valuation. † Including pork, bacon, and lard. ‡ Including tar and pitch.
§ Including tallow candles.

TABLE—Continued.

			From October 1, 1836, to September 30, 1837.			
			Exports.		Imports.	
			Quantity.	Value.	Quantity.	Value.
1	Animals for breed, and other		-	-	-	$184,379
2	Apples	barrels	20,594	$40,990		
3	Ashes, pot and pearl	tons	6,565	731,596		
4	Bacon, hams and other	pounds	965,935	-	219,634	22,018
5	Bark, oak		-	96,443		
6	Barley					
7	Beef	barrels	28,076	*585,146	158,639 lbs.	11,854
8	Butter	pounds	281,939	} 96,176 {	78,689	12,162
9	Cheese	do	411,338		194,165	22,885
10	Corn, Indian	bushels	151,276	147,982		
11	meal	barrels	159,435	763,652		
12	Cotton, unmanufactured	pounds	444,687,621	63,240,102	1,298,385	188,470
13	manufactured		-	2,831,473	-	11,150,841
14	bagging	sq. yards	-	-	3,431,675	429,251
15	Flax, manufactured		-	48,320	-	692,904
16	unmanufactured	cwt.				
17	Flaxseed	bushels	33,147	50,553		
18	Flour	barrels	318,719	2,987,269	30,709 cwt.	122,651
19	Hemp, unmanufactured	cwt.	-	-	84,965	483,792
20	manufactured		-	-	-	595,888
21	Hides and skins	No.	112,096	-	-	3,306,681
22	Hogs	do	1,100	1,299,796		
23	Hops	pounds	1,096,428	89,705		
24	Horses and mules	No.	5,786	368,094		
25	Horned cattle	do	3,237			
26	Indigo	pounds	-	-	837,850	868,213
27	Lard (see hogs)	do	6,388,174	-	52,372	5,239
28	Oats, rye, pulse, &c.	bushels	-	80,875		
29	Oil, linseed	gallons	4,660	-	-	631,093

30	Potatoes	bushels	100,703	53,630	46,772	20,823
31	Pork (see beef)	barrels	24,583	- -	158,639	11,854
32	Rice	tierces	106,084	2,309,279		
33	Rosin and turpentine	barrels	216,624	†823,419		
34	Rye meal	do	28,323	165,457		
35	Silk, raw and manufactured		- -	- -	- -	14,326,865
36	Starch	pounds				
37	Soap	do	2,208,497	‡393,031	370,274	26,189
38	Sugar	do	2,150,769	238,396	136,149,761	7,203,806
39	Tallow	do	168,795	- -	301,861	19,866
40	candles (see soap)	do	1,606,424	- -	9,053	692
41	Tar and pitch (see rosin)	barrels	42,303			
42	Tobacco	hogsheads	100,232	5,795,647		
43	manufactured	pounds	3,656,474	427,836	118,719	1,222,586
44	Wax	do	311,202	91,168		
45	Wheat	bushels	17,303	27,206	3,921,259	4,154,325
46	Wool, unmanufactured	pounds	- -	- -	10,407,699	893,873

* Including beef, tallow, hides, and horned cattle in the valuation. † Including tar and pitch. ‡ Including tallow candles.

TABLE—Continued.

			From October 1, 1837, to September 30, 1838.			
			Exports.		Imports.	
			Quantity.	Value.	Quantity.	Value.
1	Animals for breed, and other		-	-	-	$176,596
2	Apples	barrels	20,157	$41,121		
3	Ashes, pot and pearl	tons	7,745	710,342		
4	Bacon, hams and other	pounds	1,194,890	-	215,268	20,959
5	Bark, oak		-	161,694		
6	Barley					
7	Beef	barrels	23,491	*528,231	990,768	26,570
8	Butter	pounds	495,108	148,191	13,579	1,688
9	Cheese	do	664,660		123,944	14,692
10	Corn, Indian	bushels	172,321	141,992		
11	meal	barrels	171,843	722,399		
12	Cotton, unmanufactured	pounds	595,952,297	61,556,811	1,529,566	160,990
13	manufactured		-	3,758,755	-	6,599,330
14	bagging	sq. yards	-	-	1,670,337	173,325
15	Flax, manufactured		-	3,390	-	446,097
16	unmanufactured	cwt.				
17	Flaxseed	bushels	35,651	55,954		
18	Flour	barrels	448,161	3,603,299	12,731 cwt.	44,272
19	Hemp, unmanufactured	cwt.	-	-	81,391	512,506
20	manufactured		-	-	-	730,362
21	Hides and skins	No.	56,762	-	-	2,036,629
22	Hogs	do	336	†148,191		
23	Hops	pounds	854,106	53,602		
24	Horses and mules	No.	4,890	331,620		
25	Horned cattle	do	2,286			
26	Indigo	pounds	50	50	401,524	363,406
27	Lard (see hogs)	do	7,209,478	-	80	9
28	Oats, rye, pulse, &c.	bushels	-	94,553		
29	Oil, linseed	gallons	5,604	-	447,779	229,383

30	Potatoes	bushels	118,627	56,898	54,282	20,511
31	Pork (see beef)	barrels	31,356	-	990,768 lbs.	‡26,570
32	Rice	tierces	71,048	1,721,819		
33	Rosin, and turpentine	barrels	245,860	§703,394		
34	Rye meal	do	22,864	110,792		
35	Silk, raw and manufactured		-	-	-	1,564,571
36	Starch	pounds				
37	Soap	do	3,105,714	‖513,721	481,295	31,981
38	Sugar	do	408,802	30,487	153,883,863	7,586,831
39	Tallow	do	363,036	-	1,325,731	91,349
40	candles (see soap)	do	1,820,145	-	152,511	13,627
41	Tar and pitch (see rosin)	barrels	33,629			
42	Tobacco	hogsheads	100,593	7,392,029		
43	manufactured	pounds	5,083,230	577,420	-	846,937
44	Wax	do	241,819	67,181		
45	Wheat	bushels	6,291	8,125	894,536	896,560
46	Wool, unmanufactured	pounds	-	-	6,968,363	532,971

* Including beef, tallow, hides, and horned cattle in the valuation. † Including pork, bacon, and lard. ‡ Including beef. § Including tar and pitch. ‖ Including tallow candles.

TABLE—Continued.

			From October 1, 1838, to September 30, 1839.			
			Exports.		Imports.	
			Quantity.	Value.	Quantity.	Value.
1	Animals for breed, and other	-	- -	- -	- -	$292,110
2	Apples	barrels	23,470	$50,875		
3	Ashes, pot and pearl	tons	6,052	620,369		
4	Bacon, hams and other	pounds	- -	- -	316,492	32,539
5	Bark, oak	-	- -	309,696		
6	Barley	-				
7	Beef	barrels	16,189	*371,646	777,531 lbs.	23,734
8	Butter	pounds	424,609	} 127,550 {	117,120	17,514
9	Cheese	do	519,017		152,401	21,147
10	Corn, Indian	bushels	162,306	141,095		
11	meal	barrels	165,672	658,421		
12	Cotton, unmanufactured	pounds	413,624,212	61,238,982		
13	manufactured	-	- -	2,975,033	- -	14,692,397
14	bagging	sq. yards	- -	- -	2,093,693	220,023
15	Flax, manufactured	-	- -	4,057	- -	971,787
16	unmanufactured	cwt.				
17	Flaxseed	bushels	66,781	161,896		
18	Flour	barrels	923,151	6,925,170	7,348 cwt.	22,477
19	Hemp, unmanufactured	cwt.	- -	- -	87,461	607,766
20	manufactured	-	- -	- -	- -	857,636
21	Hides and skins	No.	33,852	- -	- -	3,158,029
22	Hogs	do	772	†1,777,230		
23	Hops	pounds	747,164	72,425		
24	Horses and mules	No.	4,050	291,625		
25	Horned cattle	do	1,775			
26	Indigo	pounds	- -	- -	1,168,761	1,171,644
27	Lard (see hogs)	do	7,723,834	- -	13,375	1,437
28	Oats, rye, pulse, &c.	bushels	- -	72,050		
29	Oil, linseed	gallons	3,253	- -	1,425,788	711,389

30	Potatoes -	bushels	96,569	57,536	196,869	96,326
31	Pork (see beef)	barrels	41,301	- -	777,531 lbs.	23,734
32	Rice	tierces	93,320	2,460,198		
33	Rosin and turpentine	barrels	197,267	‡688,800		
34	Rye meal	do	29,458	145,448		
35	Silk, raw and manufactured	-	- -	- -	- -	2,647,301
36	Starch	pounds				
37	Soap	do	3,322,049	§453,471	759,488	48,528
38	Sugar	do	5,169,926	549,839	195,289,024	9,924,632
39	Tallow	do	118,037	- -	507,174	50,632
40	candles (see soap)	do	1,310,008	- -	135,122	13,872
41	Tar and pitch (see rosin)	barrels	61,584			
42	Tobacco	hogsheads	78,995	9,832,943		
43	manufactured	pounds	4,257,410	616,212	- -	1,032,271
44	Wax	do	236,520	68,961		
45	Wheat	bushels	96,325	144,191	32,884	35,270
46	Wool, unmanufactured	pounds	- -	- -	7,925,173	699,538

* Including beef, tallow, hides, and horned cattle in the valuation. † Including pork, bacon, and lard. ‡ Including tar and pitch.
§ Including tallow candles.

TABLE—Continued.

			From October 1, 1839, to September 30, 1840.			
			Exports.		Imports.	
			Quantity.	Value.	Quantity.	Value.
1	Animals for breed, and other	-	-	-	-	$172,283
2	Apples	barrels	23,396	$55,131		
3	Ashes, pot and pearl	tons	5,572	533,193		
4	Bacon, hams and other	pounds	1,643,397	-	122,481	14,087
5	Bark, oak	-	-	229,510		
6	Barley	-				
7	Beef	barrels	19,681	*623,373	467,916 lbs.	12,432
8	Butter	pounds	1,177,639	210,749	25,260	3,763
9	Cheese	do	723,217		201,026	23,229
10	Corn, Indian	bushels	574,279	338,333		
11	meal	barrels	206,063	705,183		
12	Cotton, unmanufactured	pounds	743,941,061	63,870,307	2,774,722	236,177
13	manufactured	-		3,549,607	-	6,504,484
14	bagging	sq. yards	-	-	2,986,075	310,211
15	Flax, manufactured	-	-	8,242	-	5,204,693
16	unmanufactured	cwt.				
17	Flaxseed	bushels	76,970	120,000		
18	Flour	barrels	1,897,501	10,143,615	329 cwt.	430
19	Hemp, unmanufactured	cwt.	-	-	93,788	686,777
20	manufactured	-	-	-	-	687,717
21	Hides and skins	No.	112,500	†623,373	-	2,756,214
22	Hogs	do	4,854	‡1,894,894		
23	Hops	pounds	82,086	11,235		
24	Horses and mules	No.	3,631	246,320		
25	Horned cattle	do	4,259			
26	Indigo	pounds	209	209	1,126,334	1,121,701
27	Lard (see hogs)	do	7,418,847	-	98	7
28	Oats, rye, pulse, &c.	bushels	-	113,393	1,453	837
29	Oil, linseed	gallons	3,968	-	393,477	173,830

30	Potatoes	bushels	123,549	54,524	35,952	16,690
31	Pork (see beef)	barrels	66,281	-	467,916 lbs.	12,432
32	Rice	tierces	101,660	1,942,076		
33	Rosin and turpentine	barrels	215,121	‖602,529		
34	Rye meal	do	53,218	170,931		
35	Silk, raw and manufactured	-	-	-	-	9,509,948
36	Starch	pounds				
37	Soap	do	3,335,641	§451,995	214,338	13,859
38	Sugar	do	11,511,556	1,260,598	120,941,277	5,581,128
39	Tallow	do	273,946	-	593,699	50,545
40	candles (see soap)	do	1,710,454	-	72,892	8,674
41	Tar and pitch (see rosin)	barrels	44,651			
42	Tobacco	hogsheads	119,484	9,883,957		
43	manufactured	pounds	6,824,297	813,671	-	869,833
44	Wax	do	207,623	59,685		
45	Wheat	bushels	1,720,860	1,635,483	593	639
46	Wool, unmanufactured	pounds	-	-	9,898,740	846,076

* Including beef, tallow, hides, and horned cattle in the valuation. † Including horned cattle in the valuation. ‡ Including pork, bacon, and lard.
‖ Including tar and pitch. § Including tallow candles.

TABLE—Continued.

			From October 1, 1840, to September 30, 1841.			
			Exports.		Imports.	
			Quantity.	Value.	Quantity.	Value.
1	Animals for breed, and other		-	-	-	$179,721
2	Apples	barrels	25,216	$48,396		
3	Ashes, pot and pearl	tons	5,565	573,026		
4	Bacon, hams and other	pounds	2,794,517	-	120,378	13,420
5	Bark, oak		-	153,519		
6	Barley					
7	Beef	barrels	56,537	*904,918	158,174	3,629
8	Butter	pounds	3,785,993	504,815	8,525	992
9	Cheese	do	1,748,471		112,540	14,812
10	Corn, Indian	bushels	535,727	312,954		
11	meal	barrels	232,284	682,457		
12	Cotton, unmanufactured	pounds	530,204,100	54,330,341	3,182,008	281,180
13	manufactured		-	3,122,546	-	11,757,036
14	bagging	sq. yards	-	-	6,786,889	723,678
15	Flax, manufactured		-	13,400	-	642,038
16	unmanufactured	cwt.				
17	Flaxseed	bushels	32,243	50,781		
18	Flour	barrels	1,515,817	7,759,646	86 cwt.	247
19	Hemp, unmanufactured	cwt.	-	-	72,962	561,039
20	manufactured		-	-	-	977,764
21	Hides and skins	No.	45,898	-	-	3,457,248
22	Hogs	do	7,901	†2,621,587		
23	Hops	pounds	176,619	28,823		
24	Horses and mules	No.	4,348	293,143		
25	Horned cattle	do	7,861			
26	Indigo	pounds	-	-	1,350,037	1,159,887
27	Lard (see hogs)	do	10,597,654	-	80	5
28	Oats, rye, pulse, &c.	bushels	-	159,893		
29	Oil, linseed	gallons	10,072	-	476,125	234,984

30	Potatoes	bushels	136,095	64,402	45,882	17,052
31	Pork (see beef)	barrels	133,290	– –	158,174 lbs.	3,629
32	Rice	tierces	101,617	2,010,107		
33	Rosin and turpentine	barrels	244,846	‡684,514		
34	Rye meal	do	44,031	138,505		
35	Silk, raw and manufactured		– –	– –	– –	15,511,009
36	Starch	pounds				
37	Soap	do	3,414,122	‖494,577	391,996	29,912
38	Sugar	do	13,747,948	1,372,811	184,264,995	8,802,742
39	Tallow	do	980,027	– –	28,380	2,395
40	candles (see soap)	do	2,145,845	– –	29,783	3,208
41	Tar and pitch (see rosin)	barrels	77,019			
42	Tobacco	hogsheads	147,828	12,576,703		
43	manufactured	pounds	– –	7,572,197	– –	1,254,872
44	Wax	do	254,088	74,120		
45	Wheat	bushels	868,586	822,881	632	653
46	Wool, unmanufactured	pounds	– –	– –	15,006,410	1,154,953

* Including beef, tallow, hides, and horned cattle in the valuation.
‡ Including tar and pitch.

† Including pork, bacon, and lard.
‖ Including tallow candles.

TABLE—Continued.

			From October 1, 1841, to September 30, 1842.			
			Exports.		Imports.	
			Quantity.	Value.	Quantity.	Value.
1	Animals for breed, and other	-	- -	- -	- -	$28,289
2	Apples	barrels	14,239	$32,245		
3	Ashes, pot and pearl	tons	8,012	882,741		
4	Bacon, hams and other	pounds	2,518,841	- -	59,384	6,232
5	Bark, oak	-	- -	111,087		
6	Barley	-				
7	Beef	barrels	*48,581	1,212,638	186,973 lbs.	3,154
8	Butter	pounds	2,055,133	388,185	5,740	856
9	Cheese	do	2,456,607		77,124	9,071
10	Corn, Indian	bushels	600,308	345,150		
11	meal	barrels	209,199	617,317		
12	Cotton, unmanufactured	pounds	584,717,017	47,593,464	5,340,320	414,651
13	manufactured	-	- -	2,970,690	- -	9,578,515
14	bagging	sq. yards	- -	- -	4,855,255	421,824
15	Flax, manufactured	-	- -	1,038	- -	3,659,184
16	unmanufactured	cwt.				
17	Flaxseed	bushels	18,354	34,991		
18	Flour	barrels	1,283,602	7,375,356	28 cwt.	46
19	Hemp, unmanufactured	cwt.	- -	- -	39,730	267,849
20	manufactured	-	- -	- -		851,710
21	Hides and skins	No.	58,187	- -	- -	4,067,816
22	Hogs	do	5,564	†2,629,403		
23	Hops	pounds	339,181	36,547		
24	Horses and mules	No.	4,467	299,654		
25	Horned cattle	do	9,887			
26	Indigo	pounds	2,200	1,042	946,384	731,350
27	Lard (see hogs)	do	20,102,397	- -	40	3
28	Oats, rye, pulse, &c.	bushels	- -	175,082	25,778	7,027
29	Oil, linseed	gallons	4,367	- -	461,925	269,949

72

30	Potatoes	bushels	191,946	85,844	86,638	24,923
31	Pork (see beef)	barrels	180,032	- -	186,973 lbs.	3,154
32	Rice	tierces	114,617	1,907,387		
33	Rosin and turpentine	barrels	277,787	‡743,329		
34	Rye meal	do	34,190	124,396		
35	Silk, raw and manufactured		- -	- -	- -	9,448,372
36	Starch	pounds				
37	Soap	do	3,854,836	‖485,128	760,277	56,139
38	Sugar	do	3,596,879	300,389	173,864,844	6,503,563
39	Tallow	do	7,038,092	- -	8,342	760
40	candles (see soap)	do	1,981,602	- -	1,731	262
41	Tar and pitch (see rosin)	barrels	52,455			
42	Tobacco	hogsheads	158,710	9,540,755		
43	manufactured	pounds	4,476,882	525,490	- -	861,847
44	Wax	do	331,856	103,626		
45	Wheat	bushels	817,958	916,616	4,082	2,767
46	Wool, unmanufactured	pounds	- -	- -	11,420,952	797,382

* Including beef, tallow, hides, and horned cattle in the valuation.
‡ Including tar and pitch.
† Including pork, bacon, and lard.
‖ Including tallow candles.

TABLE—Continued.

			From October 1, 1842, to June 30, 1843.			
			Exports.		Imports.	
			Quantity.	Value.	Quantity.	Value.
1	Animals for breed, and other		-	-	-	$14,262
2	Apples	barrels	15,412	$32,825		
3	Ashes, pot and pearl	tons	5,436	541,004		
4	Bacon, hams and other	pounds	2,422,067	-	26,815	2,731
5	Bark, oak		-	39,538		
6	Barley		-	-	-	163
7	Beef	barrels	*37,812	1,092,949	359,801 lbs.	5,984
8	Butter	pounds	3,408,247	508,968	4,552	568
9	Cheese	do	3,440,144		30,033	3,850
10	Corn, Indian	bushels	672,608	281,749	6	3
11	meal	barrels	174,354	454,166		
12	Cotton, unmanufactured	pounds	792,297,106	49,119,806	7,658,132	386,790
13	manufactured		-	3,223,550	-	2,958,796
14	bagging	sq. yards	-	-	1,410,628	105,493
15	Flax, manufactured		-	326	-	1,484,921
16	unmanufactured	cwt.	-	-	1,219 cwt.	15,193
17	Flaxseed	bushels	35,002	49,406		
18	Flour	barrels	841,474	3,763,073	56 cwt.	141
19	Hemp, unmanufactured	cwt.	-	-	36,269	228,882
20	manufactured		-	-	-	345,270
21	Hides and skins	No.	50,340	-	-	2,619,815
22	Hogs	do	7,162	†2,120,020		
23	Hops	pounds	1,182,565	123,745		
24	Horses and mules	No.	3,195	212,696		
25	Horned cattle	do	5,181			
26	Indigo	pounds	208	198	537,658	476,201
27	Lard (see hogs)	do	24,534,217			
28	Oats, rye, pulse, &c.	bushels	-	108,640	1,155	361
29	Oil, linseed	gallons	4,185	-	165,161	94,881

30	Potatoes	bushels	144,991	47,757	28,192	11,417
31	Pork (see beef)	barrels	80,310	- -	359,801 lbs.	5,984
32	Rice	tierces	106,766	1,625,726		
33	Rosin and turpentine	barrels	188,952	‡475,357		
34	Rye meal	do	21,770	65,631		
35	Silk, raw and manufactured		-	- -	- -	2,716,460
36	Starch	pounds	-	- -	31,694	1,526
37	Soap	do	3,186,652	‖407,105	16,532	1,279
38	Sugar	do	667,447	50,780	71,339,050	2,532,618
39	Tallow	do	7,489,582	- -	11,873	897
40	candles (see soap)	do	1,998,357	- -	1,451	348
41	Tar and pitch (see rosin)	barrels	37,454			
42	Tobacco	hogsheads	94,454	4,650,979		
43	manufactured	pounds	3,424,707	278,319	381,610	464,146
44	Wax	do	475,727	137,532		
45	Wheat	bushels	311,685	264,109	12,080	8,401
46	Wool, unmanufactured	pounds	- -	- -	3,568,159	248,679

* Including beef, tallow, hides, and horned cattle in the valuation.
‡ Including tar and pitch.
† Including pork, bacon, and lard.
‖ Including tallow candles.

TABLE—Continued.

			From July 1, 1843, to June 30, 1844.			
			Exports.		Imports.	
			Quantity.	Value.	Quantity.	Value.
1	Animals for breed, and other					
2	Apples	barrels	22,324	$51,465		
3	Ashes, pot and pearl	tons	18,271	1,140,848		
4	Bacon, hams and other	pounds	3,886,976	- -	26,499	$3,222
5	Bark, oak		- -	70,370		
6	Barley		- -	- -	105,799 lbs.	3,485
7	Beef	barrels	*106,474	1,810,551	259,379 lbs.	6,312
8	Butter	pounds	3,251,952	} 758,829	{ 1,815	164
9	Cheese	do	7,343,145		56,985	7,636
10	Corn, Indian	bushels	825,282	404,008	5	6
11	meal	barrels	247,882	641,029		
12	Cotton, unmanufactured	pounds	663,633,455	54,063,501	10,889,401	651,326
13	manufactured		- -	2,898,780	- -	13,641,478
14	bagging	sq. yards				
15	Flax, manufactured		- -	- -	- -	3,492,826
16	unmanufactured	cwt.	- -	- -	6,266 cwt.	67,738
17	Flaxseed	bushels	15,006	23,749		
18	Flour	barrels	1,438,574	6,759,488	243 cwt.	139
19	Hemp, unmanufactured	cwt.	- -	- -	50,752	262,365
20	manfactured		- -	- -	- -	821,261
21	Hides and skins	No.	62,658			
22	Hogs	do	9,615	†3,236,479		
23	Hops	pounds	664,363	51,550		
24	Horses and mules	No.	5,154	315,696		
25	Horned cattle	do	10,822			
26	Indigo	pounds	2,500	1,176	1,391,708	1,145,067
27	Lard (see hogs)	do	25,746,355	- -	47	3
28	Oats, rye, pulse, &c.	bushels	- -	133,477	5,238	1,798
29	Oil, linseed	gallons	6,327	- -	307,222	155,624

30	Potatoes	bushels	182,238	74,108	100,725	33,260
31	Pork (see beef)	barrels	161,629	- -	259,379 lbs.	6,312
32	Rice	tierces	134,715	2,182,468		
33	Rosin and turpentine	barrels	362,668	‡818,692		
34	Rye meal	do	32,690	104,391		
35	Silk, raw and manufactured		- -	- -	- -	8,485,622
36	Starch	pounds	- -	- -	19,593	876
37	Soap	do	4,732,751	‖619,544	29,874	1,787
38	Sugar	do	1,858,225	140,957	186,808,695	7,196,091
39	Tallow	do	9,915,336	- -	6,828	461
40	candles (see soap)	do	3,086,566	- -	130	14
41	Tar and pitch (see rosin)	barrels	62,477			
42	Tobacco	hogsheads	163,042	8,397,255		
43	manufactured	pounds	6,075,544	536,600	721,459	975,275
44	Wax	do	963,031	278,039		
45	Wheat	bushels	558,917	500,400	446	545
46	Wool, unmanufactured	pounds	- -	- -	14,008,408	851,460

* Including beef, tallow, hides, and horned cattle in the valuation.
† Including pork, bacon, and lard.
‡ Including tar and pitch.
‖ Including tallow candles.

TABLE—Continued.

			From July 1, 1844, to June 30, 1845.			
			Exports.		Imports.	
			Quantity.	Value.	Quantity.	Value.
1	Animals for breed, and other					
2	Apples	barrels	54,022	$81,306		
3	Ashes, pot and pearl	tons	24,219	1,210,496		
4	Bacon, hams and other	pounds	2,719,360	-	30,968	$3,540
5	Bark, oak		-	70,616		
6	Barley		-	-	249 bus.	158
7	Beef	barrels	*101,538	1,926,809	27,866 lbs.	1,088
8	Butter	pounds	3,587,489	878,865	3,278	281
9	Cheese	do	7,941,187		65,109	8,841
10	Corn, Indian	bushels	840,184	411,741	13	5
11	meal	barrels	269,030	641,552		
12	Cotton, unmanufactured	pounds	872,905,996	51,739,643	13,239,935	646,966
13	manufactured		-	4,327,928	-	13,863,282
14	bagging	sq. yards	-	-	1,779,492	128,525
15	Flax, manufactured		-	14,762	-	4,923,109
16	unmanufactured	cwt.	-	-	8,879 cwt.	90,509
17	Flaxseed	bushels	178,007	81,978		
18	Flour	barrels	1,195,230	5,398,593	14 cwt.	30
19	Hemp, unmanufactured	cwt.	-	-	28,155	145,209
20	manufactured		-	-	-	1,202,164
21	Hides and skins	No.	111,636			
22	Hogs	do	6,384	†2,991,284		
23	Hops	pounds	902,072	90,341		
24	Horses and mules	No.	6,290	385,488		
25	Horned cattle	do	5,252			
26	Indigo	pounds	100	70	1,131,256	862,700
27	Lard (see hogs)	do	20,060,993			
28	Oats, rye, pulse, &c.	bushels	-	177,953	1,782	637
29	Oil, linseed	gallons	7,416	-	227,114	105,574

30	Potatoes	bushels	274,216	122,926	211,327	58,949
31	Pork (see beef)	barrels	161,609	- -	27,866 lbs.	1,088
32	Rice	tierces	118,621	2,160,456		
33	Rosin and turpentine	barrels	347,683	‡814,969		
34	Rye meal	do	35,371	112,908		
35	Silk, raw and manufactured	-	- -	- -	- -	9,949,321
36	Starch	pounds	- -	- -	24,179	1,295
37	Soap	do	4,138,313	‖623,946	- -	831
38	Sugar	do	2,193,977	175,769	115,666,656	4,780,720
39	Tallow	do	10,022,504	- -	168,681	9,505
40	candles (see soap)	do	3,490,736	- -	6	2
41	Tar and pitch (see rosin)	barrels	58,002			
42	Tobacco	hogsheads	147,168	7,469,819		
43	manufactured	pounds	5,357,370	538,498	822,885	1,161,942
44	Wax	do	814,499	234,794		
45	Wheat	bushels	389,716	336,779	281	257
46	Wool, unmanufactured	pounds	- -	- -	23,833,040	1,689,794

* Including beef, tallow, hides, and horned cattle in the valuation.
‡ Including tar and pitch.
† Including pork, bacon, and lard.
‖ Including tallow candles.

APPENDIX No. 33.

JAMES BOGARDUS'S PATENT ECCENTRIC UNIVERSAL MILL.

A patent was granted fourteen years ago to James Bogardus, of the city of New York, for a mill called the "Eccentric Universal Mill," which, on account of its importance, has been extended for fourteen years more, by special act of Congress. From the great importance of this invention to every branch of industry, it is deemed advisable to notice it in this report; for, although patented fourteen years since, the entire change which it introduces in the operation of grinding has delayed its successful introduction, and many parts of the country are not yet acquainted with its advantages.

The discovery of this simple principle has opened a new field to scientific inquiry. Mr. Bogardus has freely communicated its advantages to other arts—for instance, the polishing of dies, and the planishing of stone, glass, or metallic plates. Nothing is ventured in the prediction that the time is not far distant (when its practical application is better understood) when the specula of telescopes will, by its means, be constructed with as little expense as ordinary mirrors.

But, however difficult its scientific investigation, the practical working of these mills has already resulted in the following facts and advantages:

1. In other mills, power has to be applied not only to grind, but also to throw out, by centrifugal force, the substance ground. In this mill the peculiar motion of the plates will of itself discharge the ground substance; thus saving all the ordinary waste of power.

2. From the relative motion of the two plates, there is much less friction between them, and consequently much less direct power is required to turn the mill.

"This mill of Mr. Bogardus is of that class of invention of which but few are made in centuries. Mills are nearly the oldest machinery on record, and yet all others, however various their form, have been constructed on one uniform principle, namely, one stone or plate being stationary, and the other revolving, which, by its rapid revolution, communicates a centrifugal force to the substance introduced between the plates, and thus subjects it to their grinding action; whereas, in Mr. Bogardus's mill, the principle is entirely new, and unquestionably his original invention.

"In this mill, both plates revolve in the same direction, (with nearly equal speed,) on centres, which are apart from each other one inch, more or less—the centre of the one, or axis thereto affixed, resting on and revolving upon a stationary point; whilst the prime mover, by means of a belt or gearing, communicates motion to the other plate. The circles which are cut in the plates act like revolving shears, cutting every way, which, when in operation, causes a peculiar cutting, wrenching, or twisting and sliding motion, admirably adapted for every species of grinding. From the position of the two centres, it is named the *Eccentric Mill.* The beautiful and singular motion of these mills, which originated with himself, he has now brought to perfection, after years of study and experiment; and if the statements of those by whom these mills have been already

used are to be regarded, they must eventually supersede all other mills for all purposes of *hulling*, *cutting*, and *grinding*.

" The following are some of the advantages of mills worked on this principle :

" 1. The peculiar motion of the plates will, of itself, discharge the ground substance, so that many substances can be ground thereby which would altogether choke other mills.

" 2. In other mills a given point in one of the plates continually describes the same circle on the other ; but in this mill it traverses on the other plate, at an infinite variety of angles, every point within two concentric circles apart from each other, twice the distance of the centres of the plates, thereby rendering the wear and tear of the plates uniform, and preserving the grinding action of every point.

" 3. In other mills, the grinding power of each point increases with its distance from the centre ; but in this mill, every point from the centre to the circumference has the same grinding power. A considerably smaller mill will, therefore, effect a given purpose, and the Eccentric Mill is therefore more portable than other mills.

" 4. The ever changing action of the mill, and the quick discharge of the substance ground, prevent it from becoming heated, so that the Eccentric Mill may be profitably employed in grinding substances which, in other mills, would be either spoiled or deteriorated in quality—or, by their melting, be impossible to be ground. If other mills were driven with that speed which can be safely applied to the Eccentric Mill, they would be made red-hot in a few minutes.

" These mills have been successfully introduced for the following purposes :

" Hulling rice, coffee, and olives;

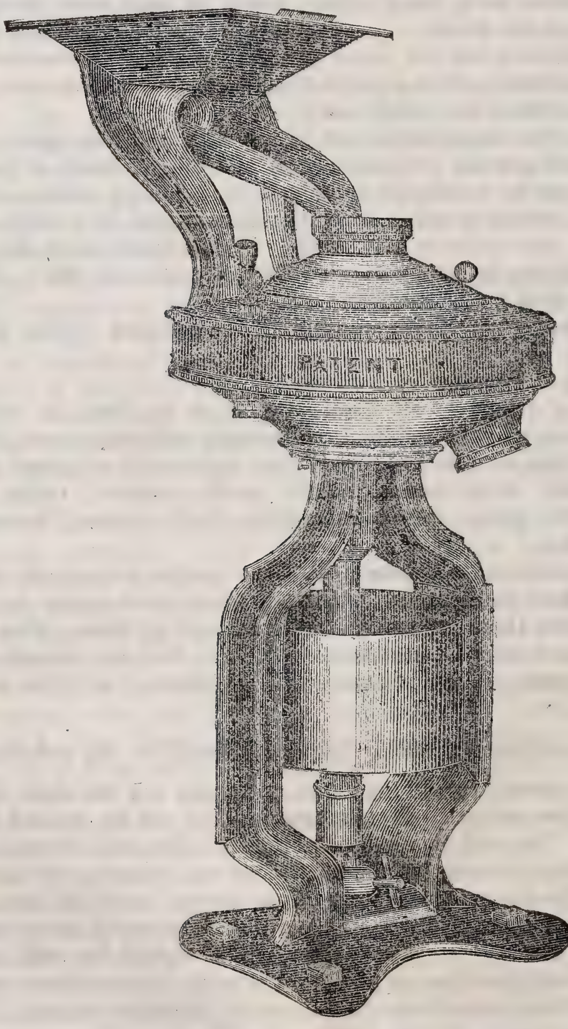
" Grinding grains of all kinds ; paints of all kinds, in water or in oil ; iron, zinc, copper, and gold oars, plumbago and manganese, bones for manure and bones for refining sugar, flint and quartz, charcoal, plaster, putty, printers' inks, drugs and dyestuffs, snuffs, mustard, coffee, spices, loaf sugar, starch, gums, resins, asphaltum, India rubber, flaxseed, and oil-cake, &c., &c.

" Of the substances enumerated, some cannot be ground at all by other mills. In short, the Eccentric Mills are more economical in the power required to drive them, and in the labor of tending them ; they are less costly for the work they do, and more portable ; they are capable of being applied to purposes for which other mills are useless ; and the wear and tear is trifling."

Directions for using Bogardus's mill for dry substances.

The mill should run to the right, and make not less than three hundred revolutions per minute. Nearly any quantity can be ground by increasing the speed. The mill is regulated to grind fine and coarse, by the under-screw, on which the end of the shaft revolves ; turning the screw to the left will bring the plates together and cause the mill to grind finer. The regulating screw is held firmly in any position, by a small screw placed against its side. There are three reservoirs, which should be well supplied with oil. The *first* is on the top of the upper plate : two or three table-spoonfuls of oil should be poured into this reservoir, through a small hole made in the top of the mill for that purpose. The second reservoir is the box,

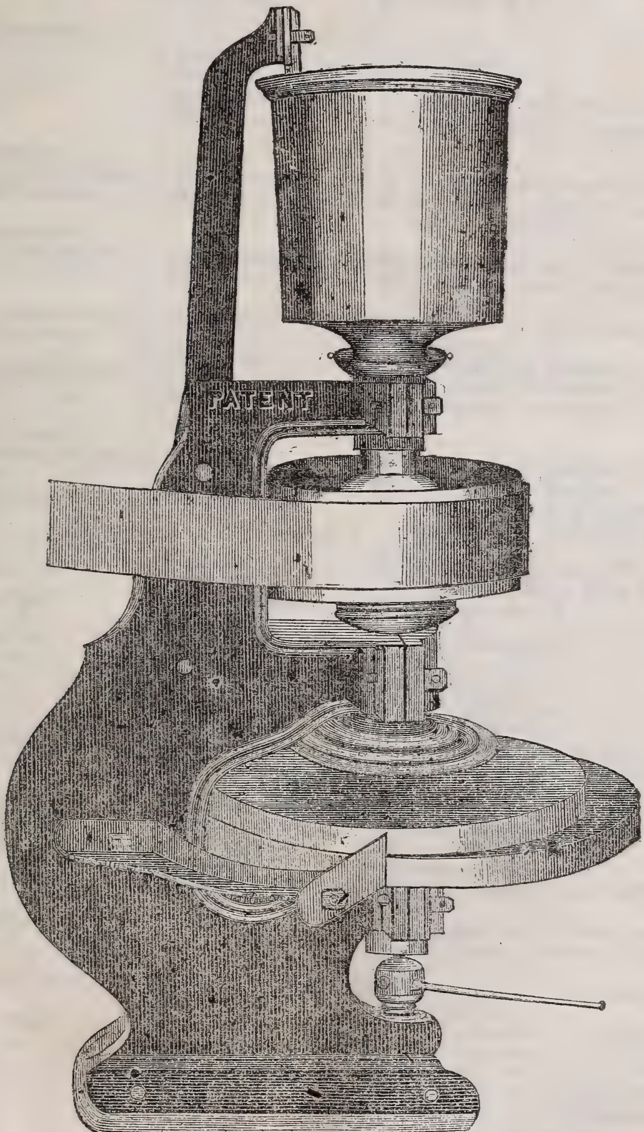
through which the main shaft passes; this is just under the spout of the mill. This reservoir should be filled with tallow, so that it may supply itself. There is also a small hole in the back part of the mill, through which oil can be poured into this reservoir, if requisite. The third reservoir is the step in which the main shaft revolves—that may be filled with oil. The feeding is regulated by a shoe, acting against the tube of the upper plate, which causes the shoe to vibrate; this, with the slide in the hopper, regulates the quantity fed into the mill. Screw holes are made round the rim of the hopper, for the purpose of extending its size to any dimensions required. The mill can be taken apart, cleaned, and the plates changed (if necessary) in a few moments.



Bogardus's eccentric mill, for hulling and grinding dry substances.

For grinding paints and liquid substances.

The mill should run to the right, and make from one hundred and fifty to two hundred revolutions per minute. The belt passes from the back of the mill, running over the front part of the pulley, leaving the front of the mill clear: the scraper must be placed just where the plates coincide with each other, so as to scrape both plates at the same time. The reservoir or step for the under plate should be well supplied with oil. A small syringe



Bogardus's eccentr'c mill, for grinding liquid substances.

may be used for that purpose, or the under plate may be taken out, (this is done in a moment by lowering the screw,) and the reservoir filled with oil. Holes are made in the screw for the purpose of putting in a wrench, by which the screw can be turned backward or forward. Turning the screw to the left will bring the plates together, and cause the mill to grind finer. After running a few hours the plates become faced, and the mill may then be set to grind as fine as desired.

APPENDIX No. 34.

WAGES OF LABOR.

State and county.	Kind of labor.	Price.
MAINE.		
Penobscot and Piscataquis -	Labor on farms -	$12 to $15 per month.
Do do -	Mechanics -	$1 25 to $1 50 per day.
NEW HAMPSHIRE.		
Portsmouth - - -	Husbandmen -	$12 per month.
Do - - -	Mechanics -	$1 per day.
Manchester - - -	Husbandmen -	$12 per month, or 75 cents per day.
Do - - -	Mechanics -	$1 25 per day; same for manufacturers.
VERMONT.		
Washington, Caledonia, Essex, Orleans, and Lamville.	Husbandmen -	75 cents per day; $12 per month.
	Mechanics -	$1 25 per day, including board, equal to 25 cents per day.
MASSACHUSETTS.		
Middlesex and Worcester -	Husbandmen -	$12 to $14 per month; 84 cents per day.
Do do -	Mechanics -	$18 to $26 per month; 87½ cents to $1 50 per day.
Berkshire, Franklin, Hampshire, and Hampden.	Husbandmen -	50 cents per day; $1 in harvest; $11 per month.
Do do -	Mechanics -	$18 per month; $1 per day.
Parts of Essex and Middlesex	Common labor -	$12 per month; 66 cents per day.
Do do -	Mechanics -	$25 per month; $1 per day.
NEW YORK.		
Columbia, Greene, Monroe, and Jefferson.	Husbandmen -	$10 per month; 50 cents per day.
	Mechanics -	$20 per month; $1 per day.
Tompkins, Chemung, & Yates	Husbandmen -	$10 to $11 per month; $120 per annum, including board, estimated at $1 25 per week.
Do do -	Mechanics -	$20 per month in villages; 20 p. ct. less in country; or $1 to $1 25 per day.
Steuben and Allegany -	Husbandmen -	$10 to $11 per month.
Do do -	Mechanics -	$1 25 per day.
Cayuga and Cortland -	Husbandmen -	$8 to $10 per month.
Do do -	Mechanics -	$1 to $1 75 per day.
Rensselaer - - -	Husbandmen -	$8 to $10 per month.
Do - - -	Mechanics -	75 cents to $2 per day.
Do - - -	Factory hands -	50 cents to $1 per day.
Suffolk and Queens - -	Husbandmen -	$10 per month, including board; or 50 cents per day, and board, which is equal to 25 cents.
Do do - -	Mechanics -	$1 25 to $2 per day, and board.
Ulster and Delaware - -	Laborers - -	$10 to $25 per month; $1 per day.
Chautauque - - -	Husbandmen -	$10 per month, and board.
Do - - -	Mechanics -	$15 per month, and board.
Washington and Essex -	Mechanics -	75 cents per day; $10, $12, and $13 per month.
Seneca and Wayne - -	Husbandmen -	$10 per month, or $120 per annum, and board; board estimated at $1 25 per week.
Do do - -	Mechanics -	$20 per month, and board, estimated at $1 50 per week.
Madison and Oswego -	Husbandmen -	$10 to $12 per month; 75 cents per day.
Do do - -	Mechanics -	$15 to $18 per month.
Onondaga - - -	Husbandmen -	$10 per month, and board.
Oneida - - -	Husbandmen -	$10 per month by the year; $15 per month in haying and harvest time; or 50 cents to $1 per day.

WAGES OF LABOR—Continued.

State and county.	Kind of labor.	Price.
NEW YORK—Continued.		
Oneida	Mechanics	$20 per month; 75 cents to $1 25 per day, board included—equal to 25 cents per day.
Herkimer and Montgomery	Husbandmen	$16 per month, exclusive of board; 62½ cents per day.
Do do	Mechanics	87½ cents to $1 25 per day; $16 to $25 per month.
City and county of Albany	Farmers	$10 per month; 62½ cents per day.
Do do	Field laborers	$10 to $12 per month, and boarded; $110 to $125 per year.
Do do	Mechanics	$1 25 to $1 75 per day, exclusive of board; and in the country, 25 cents a day less.
NEW JERSEY.		
Hunterdon, Sommerset, Mercer, and Middlesex.	Husbandmen	75 cents per day; $15 per month, exclusive of board.
Do do	Mechanics	$1 to $1 50 per day, or $200 per year.
PENNSYLVANIA.		
Lancaster, York, and Chester	Husbandmen	$10 per month; 40 to 50 cts. per day.
Do do	Mechanics	$10 to $12 per month; 75 cents to $1 per day.
Bucks and Lehigh	Laborers	$150 to $250 per annum; 50 cents to $1 50 per day.
Philadelphia city and county	Laborers	$1 per day.
Northumberland, Lycoming, Union, and Clinton.	Husbandmen	$25 per month; $1 per day, exclusive of board.
	Mechanics	$30 per month, or $1 25 per day, exclusive of board.
Columbia, Luzerne, and Wyoming.	Laborers	50 cts. per day; $9 to $12 per month.
	Mechanics	$1 per day, and board.
MARYLAND.		
Harford, Cecil, Queen Anne, Kent, and Caroline.	Farm laborers	$8 to $10 per month; 37½ to 50 cents per day.
	Mechanics	$1 to $1 25 per day.
VIRGINIA.		
Halifax, Henry, Patrick, Franklin, and Pittsylvania.	Agricultural	$5 per month.
Campbell, Buckingham, Charlotte, Prince Edward, Cumberland, Fluvanna, and Lunenburg.	Mechanics	$8 to $25 per month; 50 cents to $1 per day.
Kanawha, Jackson, Mason, Cabell, Wayne, Lewis, Braxton, Harrison, Wood, Fayette, Nicholas, Ritchie, Dodridge, Gilmer, Barbour, and Taylor.	Husbandmen	50 cents per day; $10 per month.
	Mechanics	$1 per day; $20 per month.
NORTH CAROLINA.		
Mecklenburg, Lincoln, Iredell, Davie, Rowen, Cabarras, Ashe, Wilkes, Surry, Stokes, Rockingham, and Caswell.	Mechanics	$1 per day.
	Husbandmen	50 to 75 cents per day.
Orange, Person, Granville, Franklin, Warren, and Halifax.	Husbandmen	$7 to $8 per month.
	Mechanics	$16 to $30 per month.
SOUTH CAROLINA.		
Pickens, Anderson, Greenville, and Laurens.	Farm negroes	$5 per month.
	Mechanics	$15 per month.
Chesterfield, Marlborough, Darlington, Marion, Honey, Georgetown, and Williamsburg.	Laborers	28 cts. per day for men; women less; in harvest $1 per day for scythemen.
	Mechanics	$1 to $2 per day.

WAGES OF LABOR—Continued.

State and county.	Kind of labor.	Price.
SOUTH CAROLINA—Continued.		
Spartansburg, Union, York, and Chester.	Laborers -	$6 to $10 per month, and found.
Lancaster, Kershaw, Fairfield, Richland, and Sumpter.	White laborers -	$15 per month; $160 per year.
	Negro laborers -	$8 to $10 per month; $100 per year.
	White mechanics	$25 per month; $250 per year.
	Negro mechanics	$20 per month; $200 per year.
GEORGIA.		
Dade, Walker, Chattooga, Floyd, Paulding, Murray, Gilmer, Cass, Cobb, Cherokee, Forsyth, Gwinnett, and DeKalb.	Husbandmen -	75 cents per day, or $15 per month.
	Mechanics -	Depends on trade.
ALABAMA.		
Covington, Dale, Henry, Coffee, Pike, Barbour, Macon, Montgomery, and Russell.	Laborers -	30 cents per day.
	Mechanics -	$1 50 per day.
Madison, Jackson, Marshall, De Kalb, Blount, and St. Clair.	Laborers -	25 cents per day; $6 per month.
Dallas, Lowndes, Autauga, Perry, Bibb, Jefferson, Shelby, & Coosa.	Laborers -	50 cents per day.
	Mechanics -	$1 to $2 per day.
LOUISIANA.		
St. Martin's, St. Mary, Lafayette, St. Landry, Rapides, Natchitoches, Caddo, Union, Caldwell, Ouachita, Claiborne, Bossier, Sabine, Warren, and Tenas.	Laborers, colored	50 cents per day.
	Mechanics -	$1 50 to $2 per day.
St. Tammany, St. Helena, Livingston, Washington, East and West Baton Rouge, East and West Feliciana, Point Coupee, Iberville, Catahoula, Avoyelles, Concordia, Madison, and Carroll.	Husbandmen -	$12 to $15 per month; $1 to $1 25 per day, and found.
	Mechanics -	$35 to $50 per month.
MISSISSIPPI.		
Average through the State -	Laborers, colored	50 cents per day.
	Laborers, white -	$12 to $15 per month, and found.
	Mechanics -	$30 per month.
TENNESSEE.		
Perry, Henderson, Madison, Carroll, Gibson, Weakly, and Obion.	Husbandmen -	50 cts. per day; $10 to $12 per month.
	Mechanics -	$1 to $1 50 per day; $30 to $40 per month, exclusive of board.
Campbell, Anderson, Morgan, Sevier, Blount, and Monroe.	Husbandmen -	50 cts. per day; $10 to $15 per month.
	Mechanics -	$1 to $1 50 per day; $25 to $30 per month.
KENTUCKY.		
Clay, Estill, Floyd, Harlan, Garrard, Johnson, Knox, Laurel, Letcher, Madison, Owsley, Perry, Pike, Rockcastle, Whitley.	Farmers -	$7 to $10 per month.
	Mechanics -	$15 per month.
Breckenridge, Butler, Christian, Davies, Edmonson, Grayson, Hancock, Henderson, Meade, Muhlenburg, and Ohio.	Laborers -	$80 to $150 per annum, clothed and boarded, or from $8 to $12 per month.
	Mechanics -	Various prices. In shops, by the piece, carpenters furnishing their own tools, $1 to $2 per day.
Bath, Breathett, Carter, Clarke, Fleming, Greenup, Lawrence, Lewis, Montgomery, and Morgan.	Husbandmen -	$10 per month; 50 cents per day.
	Mechanics -	$20 per month; $1 per day.

WAGES OF LABOR—Continued.

State and county.	Kind of labor.	Price.
Ohio.		
Delaware, Marion, and Richland	Husbandmen	$10 per month; 50 cents per day.
	Mechanics	$16 per month.
Franklin, Licking, and Knox	Husbandmen	$10 per month; 50 cents per day.
	Mechanics	$16 to $30 per month.
Jefferson, Carroll, and Columbia	Husbandmen	50 cents per day.
	Mechanics	62½ cents per day.
Fayette, Pickaway, and Fairfield	Husbandmen	$8 per month; 50 cents per day.
	Mechanics	75 cents to $2 per day.
Medina, Lorain, Huron, and Erie	Husbandmen	$17 50 monthly; 80 cents daily, exclusive of board.
	Mechanics	$25 monthly; $1 12½ daily. Mechanics pay more board than laborers.
Mercer, Van Wert, Paulding, Williams, Lucas, Henry, Putnam, Allen, Shelby, and Harden.	Laborers	50 cents per day.
	Mechanics	75 cents per day.
Perry, Morgan, and Washington	Laborers	50 to 62½ cents per day; $10 to $14 per month.
Butler, Preble, and Drake	Laborers	50 cents per day; $10 per month.
Warren, Montgomery, Clinton, and Greene.	Husbandmen	$13 per month, exclusive of board.
	Mechanics	$20 per month, exclusive of board.
Wood, Hancock, Crawford, Wyandot, Seneca, Sandusky, and Ottawa.	Husbandmen	$12 per month, and board.
	Mechanics	$18 per month, and board.
Indiana.		
Dearborn, Ripley, Rush, Switzerland, Decatur, and Franklin.	Husbandmen	50 cts. per day; $9 to $10 per month, including board.
	Mechanics	75 cents to $1 per day, and board.
Jasper, White, Cass, Miami, Fulton, Pulaski, Kosciusko, Marshall, Starke, Elkhart, St. Joseph, Laporte, Porter, Lake, Wabash, and Benton.	Husbandmen	$1 per day in harvest time, and 50 cents per day to common laborer, or $10 per month.
Monroe, Lawrence, Martin, Davies, Knox, Owen, Greene, Sullivan, and Morgan.	Laborers	50 cents per day; $9 per month.
Illinois.		
Lawrence, Richland, Crawford, Jasper, Effingham, Fayette, Montgomery, Christian, Shelby, Moultrie, Coles, Clark, Clay, Edgar, Macon, Piatt, and Dewitt.	Husbandmen	$8 to $10 per month; 37 to 50 cents per day.
	Mechanics	$1 per day.
Lake, McHenry, Boone, Cook, Kane, DeKalb, Dupage Kendall, Grundy, Lasalle, Will, Iroquois, Livingston, McLean, Champaign, Vermillion, and Bureau.	Laborers	75 cents to $1 per day, or $15 to $20 per month.
Alexander, Union, Jackson, Perry, Randolph, Monroe, Washington, St. Clair, Clinton, Bond, and Madison.	Farm labor	$8 to $9 per month.
	Mechanics	$1 to $1 50 per day.
Michigan.		
Macomb, Oakland, Livingston, Ingham, Clinton, Shiawassee, Genesee, Lapeer, St. Clair, Mackinac, Chippewa, Saganaw, Tuscola, Midland, Gladwin, Arenac, Ogenaw, Kanotin, Sanilac, and Huron.	Husbandmen	$10 per month; 50 to 95 cents per day, if they board themselves; $14 to $15 per month, by the year; harvest, $1 per day; board $1 per week.
	Mechanics	$1 25 to $1 50 per day, and board; without board, $2 25 to $2 50, sometimes.

WAGES OF LABOR—Continued.

State and county.	Kind of labor.	Price.
MICHIGAN—Continued.		
Branch, St. Joseph, Cass, Berrien, Van Buren, Kalamazoo, Calhoun, Jackson, Allegan, Barre, Ionia, Eaton, Oceana, Newaygo, Mecosta, Notipeko, Aischum, Manistie, and Katawabet.	Husbandmen -	50 cents to $1 per day.
	Mechanics -	$1 to $1 50 per day.
Monroe, Lenawee, Washtenaw, Wayne, and Hillsdale.	Husbandmen -	50 to 75 cents daily.
	Mechanics -	75 cents to $1 per day; $15 to $20 per month.
The editor of the Michigan Farmer estimates as the average wages of the State:	Husbandmen -	$11 per month; 50 cts. to $1 per day.
	Mechanics -	$20 per month; $1 to $2 per day.
IOWA.		
Average in Territory - -	Laborers -	$12 50 per month.
	Mechanics -	$1 50 to $2 per day.

From the Albany Cultivator.

WAGES OF LABOR.

From an instructive article on the subject of agricultural labor in different countries, its wages, and the comparative condition of the laborer, in the London Mark Lane Express, we condense the following facts: In our estimates we have called the shilling sterling 22 cents, though its value is a trifle less; and the comparison, though instituted with the English laborer, can be easily made with those of this country.

In England, the average rate of agricultural wages for an able man, with a family, is 9 shillings, or $1 98, per week. From this is to be deducted cottage rent at 35 cents per week, leaving $1 63 per week to provide himself with the necessaries of life. In France, a laborer in the same situation receives $1 04 per week; in Prussia, 66 cents; in Germany, $1 02 per week; in Holland and Belgium, $1 20; in Italy and the Austrian States, $1 15. It will be remembered that these averages are those of the common laborer—shepherds, carmen, and mechanics, receiving rather more. The food which the wages named above will purchase in the several countries, is stated in the Express as follows:

In England the laborer can obtain for his 163 cents, or his week's wages, either 39 lbs. of bread, or 11½ lbs. of meat, 7¼ lbs. of butter, 12¾ lbs. of cheese, or 174 lbs. of potatoes.

In France, with his 104 cents, he can buy either 46 lbs. of bread, 13½ lbs. of meat, or 261 lbs. of potatoes.

In Prussia, with his 66 cents per week, the laborer can buy either 36 lbs. of bread, 16 lbs. of meat, or 8¾ lbs. of butter.

In Germany, with 102 cents he obtains either 43½ lbs. of bread, 18 lbs. of meat, 11½ lbs. of butter, 24 lbs. of cheese, or 54 quarts of beer.

In Holland and Belgium, 120 cents will buy either 58 lbs. of bread, 22 lbs. of beef, or 460 lbs. of potatoes.

In Italy and the Austrian States, the laborer, with his 115 cents, can buy

either 50 lbs. of bread, 22 lbs. of beef, 8 lbs. of butter, 8 lbs. of cheese, or 168 lbs. of potatoes.

This table is interesting, as showing not only the prices of labor in the countries named, but also the price of bread, meat, butter, cheese, &c. It is true, the bread is stated by the pound instead of grain by the bushel; but, as the flour of a bushel of wheat, say 40 lbs., will make from 63 to 65 lbs. of bread, an estimate may easily be made of the quantity of wheat or flour a man in any of the countries named would receive for a week's work. The laborer in this country, who receives his bushel of wheat a day, or other articles in proportion, will readily conceive the meagre fare, and slender chance of "laying by anything," which must attend the foreign agricultural laborer. In all these countries it will be seen the value of provisions is at least as great as here, and in some instances much greater. It is only by the comparisons which such authentic statements enable them to make, that the free laborers, the farmers or mechanics of this country, can fully appreciate the advantages of their position.

APPENDIX No. 35.

CURING PROVISIONS, &c.

From the Cultivator.

ON THE CURING OF PROVISIONS FOR THE BRITISH MARKET.

Having obtained the cattle, (averaging between 600 and 800 lbs.,) our next care must be to have them properly killed; and not only the blood of each animal should be well and thoroughly drawn, but every animal should be allowed sufficient time to rest off its journey, say from 24 to 48 hours, according to circumstances, so as to allow the fever consequent on driving any distance to subside before you kill it.

The business of packing is divided into two parts. The first is to cure the meat. The second is to preserve it when cured. In the packing-house the first preparation that should be made for business is the making of the brine in which the beef is to be cured. Neither Kanawha, Zanesville, or Goose creek salt should be allowed to touch your meat, either directly by mixture with other salt, or indirectly through the medium of brine; for so sure as any of these salts are used, so sure will your meat become slimy like fish, and be imperfectly cured. The best salt I know of, for curing, is the Liverpool coarse sack salt, as it is called. The brine should be made for at least ten or fourteen days before it is required; it should be made in large vats or hogsheads, with a sufficient quantity of finely-powdered saltpetre added, to give the beef that red color which so pleases the eye, from long habit; it should be allowed to settle down and refine, and when drawn off into the tubs where the beef is to be cured, it should be clear, and entirely free from any sediment or impurity. The strength should also be tested, which, in the absence of a regular brine tester, may be done accurately enough by placing the half of a hog's head, weighing from seven to eight pounds, in the brine, which must float *perpendicularly*, the snout two inches above the surface, before the brine can be pronounced strong enough.

The next operation in the packing-house is the cutting up of the beef into eight-pound pieces, about which it is impossible to give any specific directions, as the number of pieces must entirely depend on the size, weight, and thickness of the animal. This department of the business must be guided by the hand and eye of the practical tradesman, and directed solely by his good judgment. One thing may here be remarked—that it is always well to leave two prime pieces of every carcass, say off the standing ribs, whole and uncut, to weigh from thirty-two to thirty-eight lbs., and cured in that way, for two reasons: first, when cut up to the proper size after they are cured, it leaves a freshness and bloom on those pieces for the heading, which gives to the purchaser, on opening the tierce for inspection, a certain guarantee that the meat was handled by a tradesman; and, secondly, it will facilitate the scaling of the meat much; as, should thirty-seven pieces be in the scale, wanting one piece more to weigh eight or ten pounds, more or less, that piece can be cut off this larger one to a great nicety, and avoid the delay and trouble of tossing a pile of meat over to hunt up one piece from the many, of the exact weight wanted. In scaling your meat it is not

necessary to put more than the exact weight (304 pounds) in, as beef, when cured and put into tierces, will regain fully 5 per cent. of the 10 per cent. it will have lost in the process of curing.

As your beef is cut, the coarse pieces of the fore-quarter, such as the clods, stickings, and shoulder pieces, should be selected and well rubbed with dry salt, and put into pickling tubs by themselves; the round, rump, and jump pieces of the hind-quarters should in like manner be selected, well rubbed with dry salt, and put into pickling tubs by themselves; and then your prime parts, such as ribs, sirloins, plate, and brisket pieces, should be selected, and put into the pickling tubs by themselves, and *without being rubbed.* Those pieces, being the most tender and least veiny parts of the beef, will cure more easily and quicker than the coarser parts; but after remaining a week in the brine they should be drawn, and if the brine has not sufficiently stricken, then, and not till then, should those pieces be rubbed with dry salt. The coarser pieces should be drawn and examined every fifth day at least; and if the salt should not have sufficiently stricken, and the impurities be not well extracted, then they should be *gently rubbed* a second time, and the air allowed to act for an hour or two at least on the meat and salt, before they are returned into the brine: the whole of the meat in the curing tubs must be well covered with brine, and the air entirely excluded from it. Under a good state of the atmosphere, and with proper handling of the meat, it will be cured and ready to put into the tierces in from fourteen to sixteen days; but of this the practised eye and hand of the tradesman can alone be the judge, for I know of no words to explain the feel and look of meat when cured, or when not sufficiently cured: practice and comparison alone, aided by close observation, is the only certain way of arriving at that judgment.

The propriety of sorting the meat of the three qualities, as pointed out, and having each quality cured separately, I shall endeavor to explain so as to be understood and appreciated by every person possessed of any common sense and experience. First, the finer or middle pieces of every animal, it is well known, are much more easily cured than the coarser pieces of the extremities of either the fore or hind-quarter; hence the propriety of keeping them separate, as, nine times out of ten, it is wholly unnecessary to do more to them (the finer pieces) than simply to place them in the brine, where they will cure without any rubbing, while it is necessary to rub the other pieces once at least, and sometimes oftener, with dry salt, in order to extract thoroughly those impurities which the *lean* of every animal contains in a very much larger proportion than the fatter part of the same animal does; and it is, for the same reason, right and necessary to separate the pieces cut off the extremity of the fore-quarter from those cut off the extremity of the hind-quarter, because the meat of the fore-quarter contains more of those impurities which must be extracted before it is cured, than does the meat of the hind quarter, and consequently the meat of the fore-quarters requires more care and handling, in order to cure it, than does the meat on any other part of the carcass of the animal; hence this classification will enable the curer to give to each sort of meat the required handling necessary for its preservation, without interfering with the other parts, which, if treated in the same way, (I now speak of the finer pieces,) would have their natural juices extracted, become hard, and what is commonly but erroneously called over cured. There is also another reason why this classification should be made—it is this: that it saves much time and labor, when the

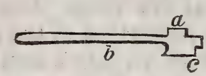
meat is selecting for the scale, by having each quality in separate bulk: the selector has but to go to either in order to lay his hand at once upon the particular piece he wants, without losing time or wasting labor in tossing over a pile of meat promiscuously cured.

When your meat is cured, the next process is the packing it away for preservation into the tierces, about which I deem it unnecessary to say anything; because, when the meat is selected and scaled, the packing it is a mere mechanical process, in which a man can alone become a proficient by practice and experience. It may be well enough to remark, that when your meat is taken out of the curing tubs it should be washed, and rid of the impurities extracted by the salt, and generally in a greater or less degree deposited on the surface, and which can be best and most easily done with the aid of water and a good hickory broom; the packer should always have by him a knife, and whenever he observes an incrustation of those impurities on the meat, which the washing had not taken off, he should use his knife to scrape it off; and if scraping does not effect it, he should cut it off.

When your tierces are packed, they must then be headed and thoroughly driven down in their *wooden hoops*, rolled by, and each tierce have its bung hole bored, and then brined with pure, clean brine, made and tested in the way before described, except that *no saltpetre* should be put in it. It is of the utmost importance that this brine should be made several days before, in order that not only the impurities of the salt, but those of the water also, should have time to settle down into a sediment, and this sediment should not be disturbed when the brine is drawn off. The want of this precaution has been the cause of much complaint and injury to the meat when exposed for sale, from the fact that when the brine was put on without first being allowed to clear itself, the impurities of both the salt and the water settled upon the meat, and made it both slimy and dirty. The tierces should remain at least fourteen days in this state, with the bungs open, and whatever the casks may have absorbed of the brine should be replenished once, if not twice, every day, and this continued until the casks will absorb no more, and the brine remains as stationary and undiminished, when filled, as though it stood in a glass bottle. The necessity for this precaution is obvious: first, if your staves are not in this way allowed to become saturated with brine, and the brine replenished before the casks are finally coopered and shipped, you can have no guarantee for your casks not leaking on the voyage; and, secondly, should this absorption be allowed to take place on the voyage, your tierces in a short time will become half empty of brine; and wherever your meat then comes in contact with the stave, it will extract from the wood its coloring matter—it will become stained and discolored, and, for the want of brine, the meat will become hard and rancid, and perhaps mouldy too. Your tierces, after standing at least fourteen days, will take no more brine. They are then ready for the bungs, which should be put in with a coarse cloth around them, and tightly driven; over each bung a piece of tin should be nailed on, but great care must be observed that the tacks with which it is fastened are so short as not to go through the stave; as, if they do, a leakage will take place that may do much harm.

Then comes the finishing stroke to the whole—the putting on of your iron hoops, and the final coopering of your tierce. As few coopers are in the habit of doing such work in the United States, I shall explain the process, so that all may understand, and perform it, if they will. In the first place,

care should be taken to clear your house of all salt and brine, in order that the hoop-iron may be keep as free from it as possible, to prevent rust and corroding. The tierce up-ended, the cooper takes off the three first wooden chime hoops; he then takes his hoop-iron and bends it around the place of the *first* hoop, and takes its accurate measure; there, he then cuts it to the length, and rivets it, which can only be well done on the face of a small anvil, or on the side of a metal half-hundred weight; he then puts this hoop on, (having eased it, by a few blows on the inside of one edge, to the shape of the cask,) and drives it to the berth of the *second* wooden hoop, leaving room for a wooden guard hoop on the outer edge of the chime; he then strips that end of the tierce of all the remainder of its wooden hoops, and takes his hoop-iron and measures around the berth of the *third* wooden bulge hoop, cuts, rivets, and shapes it, and then puts it on and drives it down to the place of the *second* bulge hoop; this done, he then puts on his wooden guard bulge hoop, which passes over the iron one, and drives it to its place, and then drives on the remainder of his wooden hoops, finishing with a guard chime hoop outside the iron one, and so proceeds on until the whole is coopered. It is necessary here to remark, that no iron driver, used perpendicularly, as coopers use their wooden drivers on wooden hoops, will ever drive an iron hoop to its place. There is a proper driver, without which the hoops cannot be driven. It is thus:



b, the handle; *a*, the head on which the blow is given; and *c*, the bite which catches the edge of the hoop: this, used with a 7-pound hammer to strike with, will drive any iron hoop to its place; but without it, the hoop cannot be stretched and driven, and consequently must remain imperfect.

AN APPRENTICED PACKER.

LOUISVILLE, KY., *November* 4, 1845.

SALTING BEEF AND PORK.

Mr. R. H. Ostrander, of Glenville, informs us that he has for several years pursued the following method with success: "In packing down pork, I sprinkle in four quarts of rock salt to a barrel, then make a pickle of warm water sufficient to cover all the meat, as strong as can be made with salt, and, when cold, pour it on; when the pickle becomes much colored with the blood of the meat, draw it off, boil it, take off the scum till it becomes clean, and apply it again; in this way pork will keep sweet throughout the ensuing summer, and will be free of rust.

"In salting beef, take four quarts of rock salt, pounded fine, eight ounces of saltpetre, and five pounds of brown sugar; mix them well together, and with these ingredients pack the meat down very closely, so as that they will of themselves cover the whole with brine. The next spring, draw off the brine, clarify it as before mentioned, adding a little salt to it, and apply it again, and the beef will keep very sweet and fine-tasted during the whole summer following."

Mr. J. R. Fuller, of Kent, Connecticut, says: "In looking over the Oc-

tober number of the Cultivator, I saw some remarks on the subject of preserving pork, with a request that if any one had practised the same method, to inform you of the result. I have for more than twenty years, with very few exceptions, cut and packed my pork and hams the evening after butchering, and always pour on the brine boiling hot, the same evening, or the next morning. The barrel should be left open until the brine gets cold. I have never known any one that has tried that method, who was not satisfied with the result. I can, therefore, with the fullest confidence recommend that method."

From the New York Farmer.

At a meeting of the Farmers' Club, the president, Dr. Rhinelander, read the following from the practice at Cincinnati: "To one barrel of 150 pounds, four quarts of salt, two pounds of sugar, and one pound of saltpetre, pounded fine, and rolled together until they are thoroughly mixed; each ham is thoroughly rubbed with that compound over the entire surface, and as far around the bone as can be reached; the hams are then placed in a barrel for two weeks; then put in six quarts of wood ashes, with ten gallons of water, and boil about two hours; let stand until settled, at the same time making a strong brine; nine gallons of brine to one gallon of lye; pack in this, and let them lie four weeks."

Mr. Woodhull.—To a barrel of hams, one gallon of molasses, two ounces of saltpetre, and cover with a strong brine; take them up in ten or twelve days, and repack them.

Mr. Walters.—For every one hundred of meat, two quarts of molasses and four ounces of saltpetre, with a strong brine.

From the American Agriculturist.

PACKING PROVISIONS FOR THE ENGLISH MARKET.

Mr. Rotch, writing us from London, says:

"The early attention you asked of your readers to the English mode of putting up provisions begins already to manifest itself in the very improved manner in which they are now brought to this market, and the improved prices they command.

"Bacon for the London market must not be enveloped, as for the country consumption, with a thick coat of fat; on the contrary, it should have but little fat, and its muscle or lean parts must be well marbled with it. However, as yet, bacon is not cured to any extent in the northern States. Tongues have been sent here, but have been so badly trimmed, so bloody, and so slovenly put up, that they did not sell for more than half price. Properly put up, they would have sold at from 4*s.* to 4*s.* 6*d.* apiece; for here they are sold at 4*s.* 6*d.* to 5*s.* 6*d.*, when cured as they should be.

From the Dollar Farmer.

CURING HAMS.

We republish the following method of curing hams. There is none better.

For every one hundred pounds of meat, take five pints of good molasses, (or five pounds of brown sugar,) five ounces saltpetre, and eight pounds rock salt; add three gallons of water, and boil the ingredients over a gentle fire, skimming off the froth or scum as it rises. Continue the boiling till the salt, &c., is dissolved. Have the hams, nicely cut and trimmed, packed in casks with the shank end down, as the pickle will thus strike in better. When the pickle, prepared as above, is sufficiently cool, pour it over the hams. They may lie in pickle from two to six weeks, according to the size of the pieces or the state of the weather—more time being required in cold than in warm weather. Beef or mutton hams, or tongues intended for smoking and drying, may be cured according to this mode, and will be found excellent.

The Albany Cultivator adds the following:

In that excellent and agreeable work entitled "Farming for Ladies," we find the following directions for preparing the celebrated "Hambro pickle," which is said to be equally applicable to beef, pork, tongues, &c. "To each gallon of water, put one pound and a half of common salt, a quarter of a pound of coarse brown sugar, and one ounce of saltpetre; boiled, and to be carefully skimmed. After standing in a proper vessel until quite cool, the meat may be immersed, and will be fit for use in ten days and improve for months; but it must be carefully kept pressed down by means of a cover, and a clean heavy stone. The pickle must be watched, and, when any scum begins to rise, the meat must be taken out and the liquor reboiled, and skimmed and cooled as before; at the same time half a pound more salt must be added, but no raw salt is to be applied at any time. The meat is to be returned when the pickle is quite cold, say after ten or twelve hours. Tongues will require a month at least, and are improved by the addition of an ounce of bay salt added to the above. One clove of garlic, half an ounce of alspice, and as much whole pepper, boiled with the ingredients, much improve it."

From the American Agriculturist.

DAVISON'S INVENTION FOR CURING PROVISIONS.

The whole apparatus is perfectly simple. It consists of a large cylinder, made *air-tight.* It has a mouth-piece, through which the meat is put into the cylinder. On this mouth-piece is fitted a lid, with its surface so adapted to the mouth-piece that no air can pass. Strong screws bind it close to the mouth-piece. On the lid are two vents, with screws to open and close them. This cylinder, mouth-piece, and lid are made of the best of iron, with a thickness proportional to their size.

There is also a large vat to hold brine. This is made of wood, and is elevated above the cylinder, and connected with it by a pipe. Through the pipe the brine passes from the vat to the cylinder. There is a lifting-pump attached to the cylinder. By it the brine is pumped from the cylinder into the vat.

The meat, being first cut, is placed in the cylinder and the brine admitted. When the cylinder is filled with the brine, the lid is closed down on the mouth-piece and screwed fast. The pump is then put into action, and the brine carried back to the vat. When the brine is all removed from the cylinder, the meat is in a vacuum; this is obvious, for the brine had of

course expelled the air; the cylinder and closed lid being air-tight, did not permit the air to return when the brine was withdrawn. The meat being in a vacuum, parts with all the blood, air, and gases which may be contained within it: these escape into the vacuum of the cylinder. The brine is now again introduced, and when the meat is covered, the air-vents in the lid are opened, and the brine drives out all the air and gases which had escaped from the meat. When the cylinder is full of brine, the air vents are closed, and the brine is pumped into the vat, and the meats are again in vacuum. Again, blood, air, and gases escape into the vacuum. The brine is again introduced, and the meat covered; the air-vents are then opened, and the air and gases escape from the cylinder, and the cylinder is filled with brine. The brine is withdrawn and returned again and again until the operation is completed. The interval of withdrawing and returning is short at first; but when the blood, air, and gases are expelled from the meat, the brine is allowed to remain on the meat for some hours—say four to eight. After the blood, air, and gases are expelled, and the meat has remained in the brine for six or eight hours, it is cured. The whole process will require about twelve hours.

The principle on which the method acts is that of a pressure upon the meat in a vacuum. In its ordinary condition the meat is filled with blood, air, and gases; when immersed in brine, in the ordinary process, these, by their resisting power, prevent the brine from entering the meat; the blood has an affinity with the brine, and leaves the meat to unite with it. The pressure of the water and its specific gravity being greater than that of the air and gases, the air and gases rise to the surface and escape, and the brine takes their place. To do this, however, takes time, and about six weeks are found necessary to accomplish it. When, however, the meat is in a vacuum, the blood, air, and gases *escape at once;* being escaped, the brine exerts its pressure, and the meat is charged at once. This pressure, in the ordinary method of curing, is nothing more than that which arises from the weight and pressure of the quantity of brine necessary to cover the meat. In the cylinder, the meat, when the blood, air, and gases have been separated from it in the vacuum, can be subjected to an illimitable amount of pressure. To do this, nothing more is necessary than the elevation of the vat. Connected as is the vat, by a pipe, to the cylinder, the pressure is in proportion to the elevation of the vat. By means of the vacuum the meat is freed from all the means of resistance to the entrance of the brine; and the pressure of the brine may be carried to any extent that the meat will bear without collapsing. When in vacuum, it is swollen, its fibre distended and pores open, and it readily admits the brine, even at the simple pressure of the mere quantity of brine which the cylinder will hold. In this matter, experience has taught that the pressure of a single atmosphere is the most effective; a greater one tends to close the pores of the vacated meat, and a triple atmospheric pressure completely closes them, to the exclusion of the brine. The whole secret of the action of this method is, that the vacuum fits the meat at once to admit the brine, and the pressure, if not too great, at once forces the brine into the vacated pores; and this done, the meat is cured. By the use of the vacuum, the natural process is shortened from weeks to hours, and the meat is cured *at least as perfectly*—indeed, far more perfectly.

The advantage of a *rapid* curing of meat in a perfect manner is obvious

to every one. But there are numerous advantages besides. Let me enumerate them:

All meats, salted and cured in the ordinary method, require two packings to pass inspection, and for family use. When the meat is cured, which will be at the end of six weeks or two months, the brine is bloody and foul. In the large packing and inspection establishments the meat is repacked, and the first brine is thrown away. With the vacuum process, the meat, when cured, at the end of twelve hours is free from blood, and ready to receive its final packing, fit to pass inspection, or keeping for family use. In the process of curing, pork increases in weight ten or eleven per cent. In the ordinary process, two months are necessary to gain this; and, of course, the interest, storing, and insurance for that period are lost to somebody. In the vacuum process the meat is cured in twelve hours, and the ten per cent. gain is *obtained at once*, and there is no loss of time, interest, storage, or insurance. In the ordinary method the packer cannot sell profitably until after two packings and two months of time; in the vacuum process he may sell in one day, reaping the gain of the increase.

The longer the meat is in curing, the more the natural juices are extracted by the brine. Hence, when the meat is cured equally well as to its being saved, its quality will be better in the short process, for its juices are not lost in the brine.

These advantages apply to all seasons of the year; and by the vacuum process there is a great gain, even in the winter, when meat can be cured by the ordinary process. But there is yet another advantage, and it is this:

Meat, by the vacuum process, may be cured in the summer as well and as perfectly and safely as in winter; once in the cylinder, it is safe. The cylinder will make it so at once, under any circumstances; but, if necessary, the cylinder may be enclosed in a wooden box, (a non-conductor,) and the space between the case and cylinder filled with powdered charcoal. This at once makes a refrigerator, and, with the brine, a temperature approaching freezing point may be maintained during the whole time of curing.

In the west, less capital for the purchase of meat will be necessary if the vacuum process be adopted; for time, interest, storage, and insurance will be saved. But to the west it will give yet another advantage: it will enable them to commence packing earlier. Not unusual is it for them, at Cincinnati and St. Louis, to be closed up in December with ice, and a stop put to shipment. If packing can commence in October, the loss of cold weather in feeding and the staying power of ice will be obviated. A hog or a beeve is fatted more easily in warm than in cold weather. But neither can be killed and cured in warm weather by the ordinary process: by the vacuum process they may. To pack in the ordinary way you must feed longer, and that even with a scarcity of food, to get to the cold weather, that you may safely cure; and by no means can you meet a present demand or a rising market. By the vacuum process you obviate long feeding, warm weather, (and that may occur even at mid-winter to spoil meat cured in the ordinary mode,) and you may meet a present demand or a rising market, without loss of interest, storage, or insurance. It may be objected that there is an expense in the vacuum process not incurred in the ordinary one. In the ordinary process you cure and wait two months, and then repack for inspection or to keep for family use. In the vacuum process you cure and pack, and are done; and the two packings of the

ordinary mode are more expensive than the curing and packing of the vacuum process. Hence there is economy in capital and outlay, in time and expense subsequent to the first packing. To this is to be added, that the meat is better on account of the retention of its natural juices in a greater degree. Here all comparison between the two methods ends. The advantages of the vacuum process, besides, are all its own.

Hitherto, when meat got skippered or tainted it was lost; now, it can be saved. If skippered when placed in a vacuum in the cylinder, the skippers come to the surface of the meat, and perish for want of air. The meat is then taken from the cylinder, the skippers removed, and the meat returned to the cylinder and again charged with pickle, and is again perfect.

If meat be tainted, it is placed in the cylinder and charged with a weak solution of lime: taken out, dried, and returned to the cylinder, and again charged with pickle; and then it is difficult to distinguish it from sound meat.

Hams and bacon, old, blackened, and spoiled in appearance, will not take in pickle by immersion: subjected to the vacuum process, they may, and in a few hours be restored to fresh appearance, and after smoking be equal to new ones.

Meat just killed and *warm* may be put, in mid summer, into the cylinder, and cured in twelve hours perfectly. By steeping, it cannot be cured at all in warm weather; in vacuum, it may be at all seasons.

Beef cured in the vacuum is done and packed in a day, and has gained its full increase. Cured by steeping, it at once loses five per cent., and takes months to regain its loss and add the usual gain arising from packing.

In hot climates, meat cannot be cured by steeping at any season; by the vacuum it can in any climate, at all seasons.

In ordinary packing, sugar, spices, or acid may be added to the brine; but in the vacuum process they will be more perfectly taken up, and the meat more highly flavored.

The vacuum process is applicable to all kinds of meats; and all kinds of fluids may be infused into meats by it. A variety of antiseptics besides salt will preserve, if they can be injected into the meat; but before the meat could take them by steeping, it would be spoiled in any weather but the coldest, and in the coldest would be stale first. By the vacuum these may be injected at once, and the meat flavored by these peculiarly preservative fluids.

To the west it offers great facilities and economies, as the west is now the great meat grower and packer.

But this invention is truly a great boon to the people of the south. They now bring their pork and beef from the west. Hereafter they may cure it for themselves. Now, they cannot, with a certainty of keeping, even in winter. With Mr. Davison's process they may cure at all seasons. Hereafter they may cure with safety and economy. They may thus become not only their own pork and beef growers, but they may add pork and beef to their exports. Indeed, in time, it may fairly be predicted that the region of country on the gulf of Mexico will be the only country that can export pork and beef profitably. Her climate will grow it without expense, for her pastures are ever green; and her fields may ever be filled with pork-fattening esculents. In no region does a good hog do better than in a

warm one. In the cotton and sugar region every planter may himself make all his bacon, for he is now able to cure it.

To families of farmers, living in the country, it offers the means of having fresh meat during the summer without waste; for, what cannot be eaten fresh can be packed, and will be the best pickled meat, as it will be recently cured.

There is yet another view in which this invention will wonderfully serve farmers and planters. By it they can impregnate wood with salt, and the wood will be indestructible; or may turn it to stone, measurably, and it shall yet be flexible, and can never rot, and only be lost by wear. By it shingles for houses, and posts for fences, may be made indestructible. To do this it is only necessary to impregnate them with brine thoroughly. But it may be carried still further, and the wood turned wholly to stone; and thus: The wood is first charged with salt, then with sulphate of iron, and dried, then charged with a solution of muriate of lime; this latter, coming in contact with the sulphate of iron, decomposes the wood and forms an insoluble compound—sulphate of lime, or gypsum. The wood then becomes stone, and yet retains toughness.

The chief merit of this apparatus is its extreme simplicity and the economy with which it operates. The solution of salt, or brine, which is used in most cases, both for curing meat and wood, is not costly. No more of it is expended than the meat or wood takes up; the balance is returned to the cistern, and serves for another or other operations. If a little sweetening matter or spices be added, the cost is not greatly increased; and for the other operations contemplated upon wood the same applies, for most of the required solutions are made from the cheapest ingredients. The apparatus, constructed of metal, will last for centuries. If it should get out of order, the rudest mechanic in the country can put it to rights. A boy of fourteen years of age can work it as well as a man. In fine, although many of the principles involved are not new ones, yet it so happens that no other apparatus heretofore invented rendered them of public utility, on account of great expense, while, by this one, they can be made *practically*, *cheaply useful*.

A. S.

NEW YORK, *December* 16, 1845.

From the American Agriculturist.

DAVISON'S PATENT PROCESS FOR CURING MEAT.

The undersigned is authorized by the patentees to sell patents for the using and sale of Davison's apparatus for curing meats, and preserving timber, and also for the sale of rights for States. By this process, all kinds of meat can be perfectly cured in twelve hours, and in warm weather as well as cold. It leaves all the juices in the meat, and of course it makes a better article. Bacon cured in it may be put to smoke in two days. It is just such an article as every planter in the south should have. Applications for rights and single machines may be made to the subscriber. The price of the machines is from $75 to $300, according to size.

A. B. ALLEN, 187 *Water St.*, *New York.*

APPENDIX No. 36.

LIST OF AGRICULTURAL JOURNALS IN THE UNITED STATES.

Maine Farmer, Augusta, Maine—weekly.
Farmers' Monthly Visiter, Concord, New Hampshire—monthly.
Boston Cultivator, Boston, Massachusetts—weekly.
New England Farmer, Boston, Massachusetts—weekly.
Massachusetts Ploughman, Boston, Massachusetts—weekly.
New York Farmer and Mechanic, New York—weekly.
American Agriculturist, New York—monthly.
Farmers' Library and Monthly Journal, New York—monthly.
American Quarterly Review of Agriculture, Albany, N. Y.—quarterly.
Cultivator, Albany, New York—monthly.
New Genesee Farmer, Rochester, New York—monthly.
Farmers' Cabinet, Philadelphia, Pennsylvania—monthly.
Lancaster County Farmer, Lancaster, Pennsylvania—weekly.
American Farmer, Baltimore, Maryland—monthly.
Southern Planter, Richmond, Virginia—monthly.
North Carolina Farmer, Raleigh, North Carolina—monthly.
Southern Agriculturist, South Carolina.
Southern Cultivator, Augusta, Georgia—monthly.
Alabama Planter, Tuscaloosa, Alabama—monthly.
Planters' Banner, Franklin, Louisiana—(partly) weekly.
Nashville Agriculturist, Nashville, Tennessee—monthly.
Dollar Farmer, Louisville, Kentucky—monthly.
Ohio Cultivator, Columbus, Ohio—weekly.
Indiana Farmer and Gardener, Indianapolis, Indiana—monthly.
Prairie Farmer, Chicago, Illinois—monthly.
Michigan Farmer, Jackson, Michigan—monthly.

APPENDIX No. 37.

MR. FLEISCHMANN'S LETTER.

VIENNA, *September* 20, 1845.

DEAR SIR: In my last from Berlin, I mentioned that I intended to assist the convention of German agriculturists, at Breslau.

I arrived a day before the commencement, entered my name as a member, and assisted the opening of the first meeting. There were upwards of a thousand agriculturists from the different parts of Germany; each State was represented by some deputies from their respective monarchs, and it was highly interesting to hear the debates on the different subjects of agriculture, in which the princes, counts, &c., joined in with the rest; and they took as much interest and evinced as much knowledge as most of the ordinary farmers themselves.

These conventions, which have been held for nine years, (every year at another city of Germany,) have already had a very beneficial influence; the farmer sees that his occupation is not only respectable, but worthy, and important to the attention of every member of the society.

The questions were debated in separate sections, and to me that of wool was of the highest interest. Silesia has now the reputation of raising the finest wool. Samples of wool were exhibited in a large room, from all parts of Germany, also Hungary, Russia, New Holland, and some of the alpaca. I spent most all my time in that room, to examine into the different characters of wool from the different countries, and especially those which resemble ours the most in regard to climate and treatment.

I obtained a collection of wool which can nowhere be got except at such an occasion, and I was told this was the only exhibition of that kind ever seen.

A new species of potatoes was exhibited, of which I obtained some bulbs. It is an early potato, and ripens the middle of June; it is different from any I ever saw; they look like cocoons, of the size of an egg.

The samples of flax and hemp were beautiful, and Silesia tries to sustain its reputation as a flax-growing country; it was its staple article for centuries, and it will ever be such.

I had various conversations with the principal flax and hemp-growers in regard to the treatment, and hope to lay before you such communications as will be interesting and useful for our country.

I saw several new machines for breaking hemp, one of which proved very useful and practical, of which I made a sketch.

The citizens of Breslau (a city of 100,000 inhabitants) exerted themselves to make their guests during the time as pleasant as possible. All the different clubs opened their establishments for us. A rich count, of the name of *Henkel*, gave a splendid ball and supper at his palace, where all the beauty and grandeur of the country around, and of the city, were assembled; diamonds, orders, ribands, stars, medals, &c., and all kinds of distinctions of honor, were massed together.

The city struck a medal in honor of the occasion, one of which I shall bring you. The King gave a great dinner at the chateau; and on Monday there

was a cattle show, distribution of prizes for the best breed of horses, cows, and sheep, a horse race, and a great procession, in which the different agricultural occupations were exhibited—the country people all in their national costume; and, after all was over, and the assembly of more than 100,000 people had dispersed, the city gave us (in a beautifully decorated and illuminated garden) a supper, and closed with splendid fire-works. Saturday evening a piece was performed in the theatre, written for the occasion by a poet of Breslau, in which Ceres shows the importance and beauty of agricultural occupation.

The agricultural implements cannot be compared with those of America; they are clumsy, and against all rules of mechanical science: here lies the fault of Germany. Science is taught at the universities, with great care and perfection, but the practical results have not yet found their way down to the common man. The system of common school education throughout Germany is excellent, but the preparatory schools for the different branches of occupation, as trade, commerce, &c., are wanting.

* * * * * * * *

I recommend myself to your friendship, and remain your obedient servant,

CH. L. FLEISCHMANN.

Hon. E. Burke.

P. S.—I called on the director of the Imperial Polytechnical School, Mr. Prechtl, who very kindly initiated me in all the details of the Austrian patent laws, which are the most liberal I have learned yet. I shall have all the laws, information, and forms of their patents, which will be at your command. He also laid before me the yearly publication of expired patents, in which an extract of the specification, or, where the specification is of importance, the whole is given, with drawings; there are only three volumes now, and I consider it very important for our office. I intend to procure it, and all such works as I find interesting, and send them on to Washington.

[Rules of German convention of farmers, and subjects for discussion from London Gardeners' Chronicle, omitted for want of room.]

APPENDIX No. 38.

CHARCOAL ROAD.

The process of making such a road is described by a writer in the Cleveland Herald, as follows:

"Timber from six to eighteen inches through is cut twenty-four feet long, and piled up lengthwise in the centre of the road about five feet high, being nine feet wide at the bottom and two at the top, and then covered with straw and earth in the manner of coal-pits. The earth required to cover the pile, taken from either side, leaves two good sized ditches, and the timber, although not split, is easily charred; and, when charred, the earth is removed to the side of the ditches, the coal raked down, to a width of fifteen feet, leaving it two feet thick at the centre and one at the sides, and the road is completed."

A road of this kind is now being made in the Cotton Wood swamp near Blissfield, in Michigan. From the writer above quoted we learn that about seventy roods are completed, twenty of which have been used for the last seven months, and the balance for three months; and as it is on the great thoroughfare west, and as, in addition, on an average, sixteen heavy loaded teams to and from an ashery pass over it daily, it has been very well tried during the winter and spring, and yet there is no appearance of ruts, but it presents an even, hard surface.

The company making the road pay the contractors at the rate of $660 a mile. The road is said to become very compact, and to be free from mud or dust. Hon. Elisha Whittlesey, and Mr. Newton, an engineer who inspected the Blissfield road above mentioned, state that they passed over it the morning after a rain.

"At each end of the different sections of the coal road the mud on the causeway was felloe deep where there was that depth of earth, and nearly or quite half-axletree deep where the logs were broken; when, on the coal road, there was not the least standing, and the impress of the feet of a horse passing rapidly over it was like that made on hard washed sand, as the surf recedes, on the shore of the lake. The water is not drained from the ditches, and yet there are no ruts or inequalities in the surface of the coal road, except what is produced by more compact packing on the line of travel. We think it is probable that coal will fully compensate for the deficiency of limestone and gravel in many sections of the west, and, where a road is to be constructed through forest land, that coal may be used at a fourth of the expense of limestone."

APPENDIX No. 39.

NATIONAL CONVENTION OF FARMERS AND SILK CULTURISTS.

Mr. Robinson, of Indiana, from the committee to prepare an address to the people of the United States, reported that they had agreed upon the following address, which they now submitted to the convention for its consideration:

To the friends of improvement in the science of agriculture, horticulture, and silk culture, in the United States:

The convention of delegates representing these important interests, now holding their third annual meeting under the call of the American Institute of New York, address their brethren who have not the good fortune to be with us upon this occasion, to congratulate them upon the fact that the course of improvement in the cultivation of the earth is still onward. And why should it not be so? We possess a country of rich soil, and a climate reaching from the line of tropical plants to that of a region so cold that man must resort to other means for support besides cultivating the earth.

But, with all our advantages of soil and climate, there appears to be a conceded opinion among all the cultivators of the earth, that they do not enjoy the advantages and comforts enjoyed by other classes of society, who never knew what it was to earn their bread by the sweat of the brow. The cotton planter of Mississippi tells us that he cannot support his laborers upon the product of his plantation, because the price of cotton is too low. But would not a more careful management, and a more diversified culture, obviate his difficulty? He is not required to raise cotton alone—his soil and climate are equally adapted to raising wool; tobacco, also, of the finest quality, will grow where cotton will, and no part of the country can excel this section of the Union for raising fruit. The remedy for over-production and low prices of cotton must be a more diversified culture and greater amount of home productions of all the things for which the cotton region is now tributary to the north. We are gratified to learn that the cultivators of sugar do not complain of their present prospects in all the cane-growing region. We do not hear of any extended operation in the manufacture of sugar from cornstalks.

We regret to learn that throughout several of the southern corn-growing States there is a great failure in the crop, owing to the excessive drought which has prevailed in nearly all parts of the United States during the last summer. For this we cannot suggest any remedy, except that, in all our cultivation, we aim to guard against a state of drought which prevails through all our country, to a far greater extent than the contrary during the crop-growing season. We hear of the same drought prevailing in Ohio, to so great a degree that there is not foliage enough to carry the stock through the winter in the northern part of the State. The soil here is a stiff clay, and, from the personal observation of one of the committee during the last summer, he is convinced that the use of the sub-soil plough upon

this soil would greatly tend to lessen the tendency to loss of crops from drought.

From Maine we hear of an almost total loss of the staple crop of our friends in that cold region of the Union, from that mysterious and very serious disease among the potatoes, that has not very inaptly been likened to the cholera in its ravages. It is of the utmost importance that all the information tending to cure this hitherto incurable disease should be concentrated, and for that purpose we recommend that the members of the corresponding committee in the several States, which have been appointed at this meeting, communicate to the committee in this city all valuable facts that they can obtain upon this subject.

From the southern part of the wheat-growing region we hear great complaints of the ravages of the weevil. The convention are anxious to gather information upon this subject. We learn that the destruction of the crop from this cause has been prevented in some regions by mixing about one bushel of lime with one hundred bushels of wheat, in the barn, which has to be winnowed out before grinding. Unless some discovery is soon made to obviate the difficulty of the weevil, the cultivation of wheat in the southern parts of Indiana and Illinois, and in all States south of that, must be abandoned.

The most abundant crop of all that we are informed of, during the present year, is that of peaches in the State of Delaware. So great has the crop been, that we hear of one individual chartering a large steamboat to take the fruit of his own and son's farms to market.

The production of wheat the past year, generally speaking, has been over an average crop, and of excellent quality.

The crop of corn in the great corn region of the west seems to be very abundant.

We also have evidence before us that tends to show that the culture of silk is now beginning to be adopted in families, where we think it may be profitably confined, while it is abandoned as unprofitable by joint stock companies.

We are pleased to learn that wool-growing is found to be profitable in all parts of the United States, and that there is an immense field open for the extension of wool growing upon the great prairies of the west, and that the business would be more profitable even than that of cotton in the southern States.

But, notwithstanding all the bountiful productions of some crops, there is evidently a general depression of the agricultural class pervading the whole country.

It is one of the objects of this convention to seek out a way by which the condition and character of the cultivators of the American soil can be elevated and improved. For this purpose we recommend the extensive formations of farmers' clubs, and largely increased reading of agricultural papers and other valuable publications, which have, of late years, been so extensively multipled for the farmer's use. We also recommend most earnestly to all our common as well as higher schools to adopt, as an unvarying branch of education, subjects calculated to impress upon the minds of the young the necessity of applying science to the cultivation of the earth, and that it is the original and most honorable, as well as the most happy and healthy of all employments. We also recommend that an earnest appeal be made to Congress to adopt at once the recommendation of our father, Wash-

ington, and establish a "Home Department" for the encouragement and support of the agricultural interests of our country. In aid of these views we offer the following resolutions:

Resolved, That the American Institute, by whose co-operation this convention was called, be requested to continue their noble efforts in the cause of agricultural improvement, by adopting measures to have this matter brought before the next meeting of Congress.

Resolved, That the members of this convention will look upon it as an act of great respect to this body, if the American Institute will again take it upon themselves to publish to the world the proceedings and views of the convention.

Resolved, That the alarming situation of a great part of the world at this time, in consequence of the disease called the rot in potatoes, requires the most active, prompt, and untiring exertions of all the producers of this most important production, to subdue, if possible, the frightful ravages of this disease, and to prove, by successful experiment, that the country which originally produced this invaluable root, one of the most sustaining sources of subsistence to the population of Europe as well as our own country, can provide a remedy to prevent its extinction.

SOLON ROBINSON,
HENRY MEIGS,
C. C. HAVENS,
Committee.

APPENDIX No. 40.

GENERAL ABSTRACT OF THE QUANTITIES, VALUE, &c., OF MANUFACTURES AND AGRICULTURAL PRODUCE MANUFACTURED AND PRODUCED IN THE STATE OF MASSACHUSETTS DURING THE YEAR ENDING APRIL, 1845.

Manufactures of cotton.—Number of mills, 302; number of spindles, 817,483; pounds of cotton consumed, 56,901,954: yards of cotton cloth manufactured, 175,682,919; value of cotton cloth, $11,164,212: pounds of cotton yarn made into cloth, 1,360,026; value of cotton yarn, $284,061: pounds of cotton thread, 443,214; value of cotton thread, $269,903: pounds of cotton batting, 2,506,565; value of cotton batting, $158,014: pounds of pelisse wadding, 176,200; value of pelisse wadding, $44,000: yards of cotton flannel, 2,718,695; value of cotton flannel, $273,259: capital invested in the manufacture of cotton, $17,739,000: males employed, 6,303; females employed, 14,407.

Calico.—Calico manufactories, 14; yards of calico printed, 40,855,810; value of calico, $4,779,817: yards of goods bleached and colored in calico factories, and not printed, 880,196; value of the bleached goods and colored, $92,000: capital invested, $1,401,500: males employed, 1,887; females employed, 166.

Bleaching and coloring.—Establishments for bleaching and coloring cotton goods, and not connected with calico establishments, 9; yards of goods bleached or colored, 22,291,008; value of goods bleached or colored, $2,074,000: capital invested, $200,500; hands employed 211.

Woolen.—Woolen mills, 178; sets of woolen machinery, 514; pounds of wool consumed, 15,387,448; yards of broadcloth, 1,022,359; value of broadcloth, $2,157,392: yards of cassimere, 2,451,458; value of cassimere, $2,416,818: yards of satinett, 3,558,720; value of satinett, $1,907,327: yards of Kentucky jeans, 1,652,345; value of Kentucky jeans, $449,685: yards of flannel or blanketing, 4,490,937; value of flannel or blanketing, $1,284,967: pounds of woolen yarn not made into cloth, 256,205; value of woolen yarn, $99,689: value of goods not specified, $561,600: capital invested, $5,604,002: males employed, 3,901; females employed, 3,471.

Carpeting.—Mills, 17; pounds of cotton consumed, 150,000; pounds of wool consumed, 1,786,238; yards of carpeting, 1,158,958; value of carpeting, $834,322: capital invested, $488,000: males employed, 715; females employed, 319.

Worsted.—Establishments for the manufacture of worsted goods, or goods of which worsted is a component part, 10; yards of such goods, 2,321,338; value of such goods, $382,858: pounds of worsted yarn, not made into cloth, 617,366; value of worsted yarn, $271,708: capital invested, $514,000: males employed, 298; females employed, 548.

Hosiery.—Establishments for the manufacture of hosiery, 17; quantity and description, 134,138; value of hosiery, $62,492: pounds of yarn not made into hosiery, 28,200; value of yarn, $32,400: capital invested, $42,500: males employed, 53; females employed, 185.

Linen.—Establishments for the manufacture of linen, 3; pounds of linen thread, twine, &c., 875,000; value of linen thread, $145,000: capital invested, $79,000: males employed, 93; females employed, 99.

Manufactures of silk.—Silk manufactories, 8; pounds of sewing-silk, 22,509; value of sewing-silk, $150,477: capital invested, $38,000: males employed, 28; females employed, 128.

Rolling, slitting, and nail mills.—Mills, 32; tons of iron not made into nails, 1,236,025: machines for manufacture of nails, 540; pounds of nails, 37,102,400; value of nails, $1,502,275: capital, $1,906,400: hands employed, 1,729.

Forges.—Number of forges, 152; tons of bar-iron, anchors, chain-cables, and other articles of wrought-iron, 5,218; value of bar-iron, chain-cables, and other articles, $538,966: capital invested, $377,685: hands employed, 422.

Pig-iron.—Number of furnaces for manufacture of pig-iron, 4; tons of pig-iron, 4,588; value of pig-iron, $148,761: capital invested, $155,000: hands employed, 235.

Hollow-ware and castings.—Number of furnaces for the manufacture of hollow-ware and castings, other than pig-iron, 91; tons of hollow-ware and castings, other than pig-iron, 20,002; value of hollow-ware and castings, $1,280,141: capital invested, $713,270: hands employed, 1,267.

Machinery.—Establishments for the manufacture of cotton, woolen, and other machinery, 114; gross value of machinery manufactured, $2,022,648: capital invested, $1,103,850: hands employed, 2,421.

Steam engines and boilers.—Establishments for manufacture of, 6; value of steam engines and boilers, $208,546; capital invested, $127,000; hands employed, 221.

Fire engines.—Shops for manufacture of, 6; fire engines, 53; value of fire engines, $37,800; hands employed, 42.

Scythes.—Manufactories, 20; scythes, 170,328; value of scythes, $113,935; capital, $69,590; hands employed, 171.

Axes, hatchets, and other edge tools.—Axe manufactories, 35; axes, hatchets, and other edge tools, 53,537; value of tools, $94,441; capital invested, $48,225; hands employed, 94.

Cutlery.—Establishments for the manufacture of, 14; value of cutlery, $148,175; capital invested, $68,725; hands employed, 197.

Butts or hinges.—Establishments for the manufacture of, 5; number of dozen of iron butts or hinges, 108,280; value of iron butts or hinges, $25,390; capital invested, $3,500; hands employed, 49.

Latches and door handles.—Establishments for manufacture of, 4; number of dozen of latches, &c., 1,300; value of door handles, &c., $3,200; capital invested, $750; hands employed, 10.

Locks.—Manufactories, 11; locks, 46,800; value of, $60,070; capital invested, $23,600; hands employed, 75.

Tacks and brads.—Manufactories, 26; pounds of tacks and brads, 3,058,175; value of tacks and brads, $253,687; capital invested, $123,225; hands employed, 269.

Shovels, spades, forks, and hoes.—Manufactories of, 39; value of shovels, &c., $275,212; capital invested, $123,950; hands employed, 259.

Ploughs.—Manufactories, 73; ploughs and other agricultural tools, 61,334; value of the same, $121,691; capital invested, $58,575; hands employed, 158.

Iron railings, fences, and safes.—Shops for manufacture of, 7; value of, $129,300; capital invested, $53,000; hands employed, 87.

Copper.—Manufactories, 19; pounds of copper, 2,430,000; value of copper, $610,950; capital invested, $329,000; hands employed, 197.

Brass foundries.—Foundries, 26; value of articles manufactured in brass foundries, $331,890; capital invested, $167,600; hands employed, 145.

Britannia ware.—Establishments for the manufacture of, 9; value, $102,550; capital, $49,350; hands employed, 93.

Metal buttons.—Manufactories of, 2; number of gross of, 98,546; value of, $56,080; capital invested, $51,500; hands employed, 60.

Glass.—Manufactories, 10; value of glass ware, $758,300; capital invested, $700,200; hands employed, 630.

Starch.—Manufactories, 6; pounds of starch manufactured from wheat or flour, 2,683,000; value of all the starch, $119,950; capital invested, $37,500; hands employed, 39.

Chemical preparations.—Establishments for manufacture of, 13; value of, $331,965; capital invested, $251,700; hands employed, 113.

Paper.—Manufactories, 89; tons of stock consumed, 12,886; quantity of, tons, 4,765; reams, 607,175; value of paper, $1,750,273; capital invested, $1,144,537; hands employed, 1,369.

Musical instruments.—Manufactories, 31; value of, $548,625; capital invested, $293,100; hands employed, 427.

Clocks.—Manufactories, 9; number of clocks, 21,409; value of clocks, $54,975; capital invested, $10,350; hands employed, 40.

Chronometers, watches, gold and silver ware, and jewelry.—Establishments for manufacture of, 55; value of, $305,623; capital invested, $126,225; hands employed, 293.

Brushes.—Manufactories, 19; value of brushes, $153,900; capital invested, $68,875; hands employed, 220.

Saddles, harnesses, and trunks.—Manufactories of, 299; value of saddles, &c., $422,794; capital invested, $144,540; hands employed, 648.

Upholstery.—Manufactories of, 58; value of, $354,261; capital invested, $124,700; hands employed, 275.

Hats and caps.—Manufactories, 143; number of caps and hats, 677,347; value of hats and caps, $734,942; capital invested, $213,793; hands employed, 1,003.

Cordage.—Manufactories, 49; pounds of cordage, 9,398,783; value of, $906,321; capital invested, $540,930; hands employed, 637.

Cards.—Manufactories, 30; value of cards of all kinds, $323,845; capital invested, $171,500; hands employed, 147.

Salt.—Establishments for manufacture of, 562; bushels of salt, 330,112; value of salt, $79,980; capital invested, $399,285; hands employed, 584.

Railroad cars, coaches, chaises, wagons, sleighs, and other vehicles.—Establishments for manufacture of vehicles, 563; value of vehicles, $1,343,576; capital invested, $553,434; hands employed, 1,881.

Lead.—Manufactories, 11; value of manufactories of lead, $90,880; capital invested, $72,700; hands employed, 50.

Sugar, refined.—Sugar refineries, 2; pounds of sugar, 8,433,000; value of sugar, $940,000; capital invested, $410,000; hands employed, 106.

Oil and sperm candles.—Establishments for manufacture of, 60; gallons of oil, 3,743,828; value of oil, $2,945,493; pounds of spermaceti candles,

2,241,192; value of sperm candles, $668,303; capital invested, $2,451,917; hands employed, 306.

Soap, and tallow candles.—Establishments for manufacture of, 109; barrels of soft soap, 18,949; pounds of hard, 13,350,760; value of all the soap, $666,190; pounds of tallow candles, 1,802,444; value of tallow candles, $169,966; capital invested, $405,872; hands employed, 343.

Powder.—Mills, 11; kegs of, 67,400; value of powder, $165,500; capital invested, $120,000; hands employed, 49.

Fire-arms.—Establishments for manufacture of, 18; number of fire-arms, 24,465; value of fire-arms, $260,819; capital invested, $789,848; hands employed, 357.

Cannon.—Establishments for manufacture of, 3; number of cannon, 277; value of, $82,000; capital invested, $120,000; hands employed, 48.

Chocolate.—Number of mills, 6; pounds of chocolate, 451,901; value of, $81,672; capital invested, $47,500; hands employed, 27.

Chairs and cabinet ware.—Manufactories, 449; value of chairs, &c., $1,476,679; capital invested, $477,374; hands employed, 2,594.

Tin.—Manufactories of tin ware, 231; value of tin ware, $793,624; capital invested, $343,710; hands employed, 719.

Combs.—Manufactories, 71; value of combs, $198,965; capital invested, $73,100; hands employed, 340.

White lead and other paints.—Establishments for manufacture of, 11; pounds of white lead, 2,872,000; value of white lead, $164,000; value of other paints, $192,200; capital invested, $253,500; hands employed, 106.

Linseed oil.—Mills for manufacture of, 4; gallons of oil, 278,000; value of oil, $181,000; capital invested, $77,000; hands employed, 34.

Glue and gums.—Establishments for manufacture of glue and preparation of gums, 20; value of glue and gums, $387,575; capital invested, $283,695; hands employed, 93.

Cotton-gins.—Establishments for manufacture of, 4; value of cotton-gins, $45,444; capital invested, $75,000; hands employed, 48.

Flouring-mills.—Mills, 26; barrels of flour, &c., 63,200; value of flour, $174,805; capital invested, ——— ; hands employed, 30.

Tanneries.—Tanneries, 473; hides tanned, 1,755,858; value of leather tanned and curried, $3,836,657; capital invested, $1,9000,545; hands employed, 2,043.

Boots and shoes.—Number of pairs of boots, 3,768,160; number of pairs of shoes, 17,128,152; value of boots and shoes, $14,799,140; males employed, 27,199; females employed, 18,678.

Straw bonnets and hats, straw braids, and palm-leaf hats.—Number of straw bonnets and hats, 1,046,954; value of straw bonnets and hats, $1,057,892; value of straw braid manufactured, and not made into bonnets or hats, $102,367; number of palm-leaf hats, 2,845,264; value of palm-leaf hats, $489,237; females employed, 13,311.

Bricks.—Number of thousands of bricks, 110,076; value of bricks, $612,832; hands employed, 1,407.

Snuff, tobacco, and cigars.—Value of, $324,639; hands employed, 572.

Mathematical and philosophical instruments.—Value of, $54,050; hands employed, 68.

Building-stone.—Value of building, quarried and prepared, $1,065,599; hands employed, 1,819.

Marble.—Value of marble quarried and prepared, $220,004; hands employed, 312.

Lime.—Casks of, 46,331; value of, $43,629; hands employed, 80.

Mineral coal and iron-ore.—Value of, mined, $21,669; hands employed, 78.

Whips.—Value of, $111,947; hands employed, 35.

Blacking.—Value of, $10,422; hands employed, 35.

Blocks and pumps.—Value of, $127,249; hands employed, 204.

Mechanics' tools.—Value of, $161,899; hands employed, 256.

Wooden ware.—Value of, not otherwise enumerated, including farming utensils, $416,366; hands employed, 806.

Brooms.—Number of corn and other brooms, 1,545,985; value of brooms, $200,814; hands employed, 313.

Steel pens.—Number of gross of steel pens, 30,000; value of, $15,000; capital invested, $5,000; hands employed, 12.

Cooperage.—Value of casks, &c., $269,935; hands employed, 487.

Fringe and tassels.—Manufactories of, 4; value of, $54,300; capital invested, $11,700; hands employed, 106.

Boxes of all kinds.—Value of, $215,105; hands employed, 235.

Earthen ware and stone ware.—Value of, $52,025; capital invested, $15,500; hands employed, 72.

Sashes, doors, blinds, and frames.—Value of, $180,131: hands employed, 215.

Lasts.—Number of, 123,500; value of, $80,145: hands employed, 84.

Lard oil.—Manufactories, 5; gallons of, 274,000; value of, $212,150: pounds of stearine, 112,000; value of stearine, $7,840: capital invested, $91,000: hands employed, 37.

Dyeing.—Amount received for, $98,700: males employed, 79; females employed, 35.

Vessels.—Vessels launched, 112; tonnage, 26,312; value of vessels, $1,172,147: hands employed, 1,017.

Boats.—Boats built, 1,861; value of, $82,943: hands employed, 164.

All other articles manufactured.—Gross value of, $4,758,384: capital invested, $1,587,760: hands employed, 3,232.

Lumber and shingles.—Thousands of lumber, 83,995; value of lumber, $888,245: thousands of shingles, 16,423; value of shingles, $32,861: hands employed, 2,506.

Firewood, bark, and charcoal.—Cords of firewood, 368,554; value of firewood, $1,010,328: cords of bark, 9,957; value of bark, $29,851: bushels of charcoal, 775,925; value of charcoal, $48,477: hands employed, 2,925.

Oil, coal, &c., consumed in manufacturing.—Gallons of sperm oil, 282,754; value of sperm oil, $255,434: gallons of whale oil, 56,548; value of whale oil, $26,043: gallons of all other kinds of oil, 321,369; value of all other kinds of oil, $166,505: tons of anthracite coal, 79,749; value of anthracite coal, $453,411: chaldrons of bituminous coal, mined in the United States, 16,388; value of bituminous coal, mined in the United States, $147,917: chaldrons of foreign bituminous coal, 22,085; value of foreign bituminous coal, $190,405: value of all other articles of American production, excepting cotton, wool, and iron, $3,144,288; value of all other articles of foreign production, excepting cotton, wool, and iron, $2,055,082.

Whale fishery.—Vessels employed in, 479; tonnage, 143,451; gallons of sperm oil, 6,704,716; value of sperm oil, $6,233,276: gallons of whale oil, 9,572,990; value of whale oil, $2,961,619: gallons of other oil, 72,409; value of other oil, $28,754: pounds of whalebone, 2,937,509; value of whalebone, $1,147, 518: capital invested, $11,805,910: hands employed, 11,378.

Mackerel and cod-fishery.—Vessels employed in the mackerel and cod-fisheries, 967; tonnage, 51,796; barrels of mackerel, 86,628; value of mackerel, $637,052: quintals of codfish, 334,901; value of codfish, $746,263: value of other fish and lobsters, $100,822: bushels of salt consumed in the mackerel and cod-fisheries, 491,064: capital invested, $1,238,640: hands employed, 7,866.

Sheep and wool.—Saxony sheep, 33,875; Merino sheep, 165,428; other kinds of sheep, 155,640; value of all the sheep, $558,284: pounds of Saxony wool, 93,218; pounds of Merino wool, 487,050; pounds of all other wool, 435,962; value of all the wool, $365,136.

Asses, horses, cattle, and swine.—Asses and mules, 47; value of, $2,785: horses, 65,181; value of horses, $3,451,118: neat-cattle, 276,549; value of neat-cattle, $5,327,199: swine, 104,740; value of swine, $917,435: value of beef, &c., slaughtered for market, $225,918.

Grain.—Bushels of Indian corn or maize, 1,985,215; value of Indian corn or maize, $1,352,677: bushels of wheat, 47,986; value of wheat, $54,502: bushels of rye, 446,925; value of rye, $328,033: bushels of barley, 121,931; value of barley, $72,261; bushels of oats, 1,238,159; value of oats, $405,657: bushels of buckwheat, 32,274; value of buckwheat, $15,099.

Vegetables, hay, &c.—Bushels of potatoes, 4,767,115; value of potatoes, $1,309,030: bushels of other esculent vegetables, 1,604,789; value of other esculent vegetables, $515,082: tons of millet, 1,339; value of millet, $8,476: tons of hay, 603,482; value of hay, $5,214,357: pounds of flax, 5,896; value, $665.

Fruit.—Bushels of, 2,980,143; value of, $744,540.

Hops.—Pounds of, 365,130; value of, $32,251.

Tobacco.—Pounds of, 265,560; value of, $16,686.

Raw silk.—Pounds of, 194; value of, $952.

Teazles.—Thousands of, 3,148; value of, $3,308.

Butter.—Pounds of, 7,688,556; value of, $1,116,709.

Cheese.—Pounds of, 7,262,637; value of, $398,174.

Honey and Beeswax.—Pounds of honey, 92,055; value of honey, $13,206; pounds of beeswax, 3,118; value of beeswax, $981.

Shoe pegs.—Bushels of, 13,808; value of, $18,206.

Milk.—Gallons of, 2,850,412; value of $304,917.

Maple sugar.—Pounds of, 573,048; value of, $41,443.

Poultry and eggs.—Value of, $25,891.

Garden seeds.—Value of, $4,721.

Berries.—Value of, $10,842.

Broom seed and brush.—Value of $86,111.

N. B.—The secretary of the State says, in his preface, "the returns of agricultural products, in particular, are believed to fall far below the truth."

Summary showing the value of the articles manufactured, the amount of capital invested, and the number of hands employed, according to the returns, in the State of Massachusetts, for the year ending April 1, 1845.

Articles.	Value.	Capital invested.	Hands employed.
Anchors, chain cables, &c.	$538,966	$377,685	422
Axes, hatchets, and other edge tools	94,441	48,225	94
Beef, &c., slaughtered	225,918		
Beeswax	981		
Berries	10,842		
Blacking	10,422	–	35
Bleaching, or coloring	2,166,000	200,500	211
Blocks and pumps	127,249	–	204
Boats	82,943	–	164
Boots and shoes	14,799,140	–	45,877
Boxes of all kinds	215,105	–	235
Brass articles	331,891	167,600	145
Bricks	612,832	–	1,407
Britannia ware	102,550	49,350	93
Broomseed and brush	86,111		
Brooms	200,814	–	313
Brushes	153,900	68,875	220
Butter	1,116,709		
Buttons, metal	56,080	51,500	60
Butts, or hinges	25,390	3,500	49
Calico	4,779,817	1,401,500	2,053
Candles, sperm, and oil	3,613,796	2,451,917	306
Candles, tallow, and soap	836,156	405,872	343
Cannon	82,000	120,000	48
Cards	323,845	171,500	147
Carpeting	834,322	488,000	1,034
Cars, railroad carriages, and other vehicles	1,343,576	553,434	1,881
Chairs and cabinet ware	1,476,679	477,374	2,594
Cheese	398,174		
Chemical preparations	331,965	251,700	113
Chocolate	81,672	47,500	27
Clocks	54,974	10,350	40
Coal, mineral, and iron ore	21,669	–	78
Combs	198,965	73,100	340
Cooperage	269,935	–	487
Copper	610,950	329,000	197
Cordage	906,321	543,930	647
Cotton goods of all kinds	12,193,449	17,739,000	20,710
Cutlery	148,175	68,725	197
Dyeing	98,700	–	114
Earthen and stone ware	52,025	15,500	72
Engines, fire	37,800	–	42
Engines and boilers, steam	208,546	127,000	221
Fire-arms	260,819	789,848	357
Fishery, mackerel and cod	1,484,137	1,238,640	7,866
Fishery, whale	10,371,167	11,805,910	11,378
Flax	665		
Flour and other grain	174,805	44,550	30
Fringe and tassels	54,300	11,700	106
Fruit	744,540		
Gins, cotton	45,444	75,000	48
Glass	758,300	700,000	630
Glue	387,575	283,675	93
Grain	2,228,229		
Hats and Caps	734,942	213,793	1,003
Hay	5,214,357		
Hollow ware and castings, other than pig iron	1,280,141	713,270	1,267

SUMMARY—Continued.

Articles.	Value.	Capital invested.	Hands employed.
Honey	$13,206		
Hops	32,251		
Hosiery and yarn	94,892	$42,500	238
Instruments, mathematical, &c.	54,040	–	68
Iron, pig	148,761	155,000	235
Iron railing, fences, and safes	129,300	53,000	87
Jewelry, including chronometers, watches, gold and silver ware	305,623	126,225	293
Lasts	80,145	–	84
Latches and door handles	3,200	750	10
Lead pipe, and lead manufactures	90,880	72,700	50
Lead, white, and paints	356,200	253,500	106
Leather	3,836,657	1,900,545	2,043
Lime	43,629	–	80
Linen thread	145,000	79,000	192
Linseed oil	181,100	77,000	34
Locks	60,070	23,600	75
Lumber and shingles	921,106	–	2,506
Machinery	2,022,648	1,103,850	2,421
Maple sugar	41,443		
Marble	220,004	–	312
Milk	304,917		
Millet	8,476		
Musical instruments	548,625	293,100	427
Oil, lard	219,990	91,000	37
Oil.—(*See candles and fishery.*)			
Paper	1,750,273	1,144,537	1,369
Pens, steel	15,000	5,000	12
Ploughs and agricultural tools	121,691	58,575	158
Potatoes	1,309,030		
Poultry and eggs	25,891		
Powder	165,500	120,000	49
Rolled and slit iron and nails	2,738,300	1,906,400	1,729
Saddles, harnesses, and trunks	422,794	144,540	648
Salt	79,980	399,285	584
Sashes, blinds, and doors	180,181	–	215
Scythes	113,935	69,590	171
Seeds	4,721		
Shoe pegs	18,206		
Shovels, spades, forks, and hoes	275,212	123,950	259
Silk, raw	952		
Silk, sewing	150,477	38,000	156
Snuff, tobacco, and cigars	324,639	–	572
Soap. (*See candles.*)			
Starch	119,950	37,500	39
Stone, building	1,065,599	–	1,849
Straw bonnets and hats			
Palm-leaf hats and braid	1,649,496	–	13,311
Sugar, refined	940,000	410,000	106
Tacks and brads	253,687	123,225	269
Teazles	3,308		
Tin ware	793,634	343,710	710
Tobacco	16,686		
Tools, mechanics'	161,899	–	256
Upholstery	354,261	124,700	275
Vegetables, other than potatoes	515,082		
Vessels	1,172,147	–	1,017
Whips	111,947	–	526
Wood, (fire) bark and charcoal	1,088,656	–	2,92
Wooden ware	416,366	–	806
Wool	365,136		

SUMMARY—Continued.

Articles.	Value.	Capital invested.	Hands employed.
Woolen goods of all kinds - - - -	$8,877,478	$5,604,002	7,372
Worsted goods - - - - - - -	654,566	514,000	846
Stoves, bread, beer, books and stationery, balances, matches, lamps, pickles, paper hangings, types, umbrellas, &c., &c., &c. - - - -	4,758,384	1,587,760	3,232
Total - - - -	114,478,443	59,145,767	152,766

Number and value of cattle, stock, &c., returned under the act.

Cattle, stock, &c.	Number.	Value.
Asses and mules - - - - - - -	47	$2,785
Cattle - - - - - - - -	276,549	5,327,199
Horses - - - - - - - -	65,181	3,451,118
Sheep - - - - - - - -	354,943	558,284
Swine - - - - - - - -	104,740	917,435
Total - - - - -	801,460	10,256,821

According to the above, the average value of each of these animals is as follows:

Asses and mules about - - - - - -	$59 50
Cattle - - - - - - - -	19 25
Horses - - - - - - - -	52 91
Sheep - - - - - - - -	1 54
Swine - - - - - - - -	8 75

Summary of population, products, manufactures, &c., taken from the State census of New York for the year 1844.

Population, 2,604,495.
No. of acres of improved land, 11,757,276½.

				Aver. No. of bushels per acre.
Barley,	No. of acres, 192,503 4-5	No. of bushels raised,	3,108,704 11-12	about 16 1-10
Peas,	" 117,379	"	1,761,503 1-10	" 15
Beans,	" 16,231 15-19	"	162,187⅔	" 10
Buckwheat,	" 255,495⅔	"	3,634,679 7-12	" 14 1-6
Turnips,	" 15,322 9-23	"	1,350,332	" 88
Potatoes,	" 255,162 3-5	"	23,653,418	" 92⅔
Flax,	" 46,089	No. of lbs. raised,	2,897,062⅛	" 62⅓ lbs.
Wheat, sown,	" 1,013,665	No. of bushels raised,	13,391,770⅔	" 13½
Wheat, harvested,	" 958,233⅞			
Corn,	" 595,135	"	14,722,114⅞	" 24 4-5
Rye,	" 317,099 1-6	"	2,966,322½	" 9⅓
Oats,	" 1,026,915⅛	"	26,323,051	" 26

No. of neat cattle - - - - - - - -	2,072,330
No. of cows milked - - - - - - - -	999,490
No. of pounds of butter made - - - - - - -	79,501,733½
No. of pounds of cheese made - - - - - - -	36,744,976
No. of horses - - - - - - - - -	505,155
No. of sheep - - - - - - - - -	6,443,855
No. of fleeces - - - - - - - - -	4,607,002½
No. of pounds of wool - - - - - - - -	13,864,828
No. of hogs - - - - - - - - -	1,584,344

	Value of raw material.	Value of manufactured articles.
No. of grist mills, 1,984 - - -	$18,580,372 20	$22,794,474 29
No. of saw mills, 7,406 - - -	4,210,713 38	7,577,154 28
No. of oil mills, 87 - - - -	1,363,074 50	1,695,025 50
No. of fulling mills, 740 - - -	1,125,539 78	1,660,881 25
No. of carding mills, 820 - - -	1,416,904 07	1,678,320 42

No. of cotton factories, 118; value of raw material, $1,132,702 12; value of manufactured article, $2,877,500 29; No. of yards of cloth manufactured, 31,234,633¾.

No. of woolen factories, 345; value of raw material, $2,877,804 55; value of manufactured article, $4,281,257 31; No. of yards of cloth manufactured, 4,916,998 7-12; No. of yards of woolen and cotton, 1,592,899½.

	Value of raw material.	Value of manufactured articles.
No. of iron works, 500 - - -	$4,451,674 84	$8,402,586 63
No. of trip hammers, 156 - - -	284,360 00	586,328 00
No. of distilleries, 221 - - -	3,162,586 56	4,222,154 59
No. of asheries, 738 - - -	613,516 44	909,194 85
No. of glass factories, 15 - - -	115,200 00	378,700 00
No. of rope factories, 79 - - -	659,413 00	918,540 00
No. of chain-cable factories, 7 - -	2,500 00	5,000 00
No. of oilcloth factories, 24 - -	167,992 00	270,260 00
No. of dyeing and printing factories, 18 -	1,497,038 25	2,086,986 35
No. of clover mills, 115 - - -	107,803 72	124,567 00
No. of paper mills, 82 - - -	369,966 50	702,505 44
No. of tanneries, 1,414 - - -	4,052,949 95	6,585,006 31
No. of breweries, 102 - - -	805,597 50	1,313,273 00

No. of silk incorporated manufactories, 71; unincorporated, 1,608.
No. of merchants, 20,758.
No. of manufacturers, 13,088.
No. of mechanics, 3,549.

INDEX.

K.—*Classified list of patents granted during the year 1845, with the names of patentees, places of residence, and date of patent.*

CLASS I.—AGRICULTURE, INCLUDING INSTRUMENTS AND OPERATIONS.

75

Inventions or discoveries.	Patentees.	Residence.	When issued.
Bee-hives	Elias Jones	Amsterdam, N. Y.	February 12, 1845
Bee-hives	Silas Hart	New Haven, N. Y.	March 26, 1845
Bee-hives	Abraham Sanburn	Carthage, Ohio	March 26, 1845
Bee-hives	Clark Wheeler	Little Valley, N. Y.	June 20, 1845
Bee-hives	Israel Lamborn	Marshallton, Pa.	August 26, 1845
Bee-hives	Christopher Suydam	Lambertsville, N. J.	November 18, 1845
Bee-hives	James Robb	Lewiston, Pa.	December 31, 1845
Bee-hives	Aaron Colton	Pittsfield, Vt.	December 31, 1845
Bee-hives, entrance to	George Upham	Hebron, Ohio	May 1, 1845
Bee-house	Abraham Decker	Walnut township, Ohio	July 30, 1845
Bees, managing	Elias Parks	Wheatfield, N. Y.	July 22, 1845
Clover mill, for hulling, &c., (patent dated May 4	Henry Hizer	Wooster, Ohio	June 14, 1845
Clover mill, for hulling, &c.	Samuel W. Powell	Turbet, Pa.	August 16, 1845
Corn-fodder, cutting and crushing	Hiram A. Pitts	Winthrop, Maine	May 1, 1845
Corn-sheller	Joseph D. Briggs	Saratoga, N. Y.	June 14, 1845
Corn-sheller	Thomas D. Burrall	Geneva, N. Y.	December 6, 1845
Cotton-cleaner	Fones McCarthy	Demopolis, Ala.	February 12, 1845
Cultivator	Almond Harrison	Blissfield, Mich.	September 2, 1845
Cultivator	Andrew Ralston	West Middleton, Pa.	September 2, 1845
Cultivator	Allen Eldred	Openheim, N. Y.	December 20, 1845

K.—LIST OF PATENTS GRANTED DURING THE YEAR 1845—Continued.

Inventions or discoveries.	Patentees.	Residence.	When issued.
Cultivator and seed-planter	R. H. Springsteed	Wooster, Ohio	February 12, 1845
Cultivator tooth	David B. Rogers	Stafford, N. Y.	November 1, 1845
Cutting and grinding fodder	Jacob Royer	Uniontown, Md.	March 12, 1845
Flax-pullers	James H. Bennett	East Bennington, Vt.	January 23, 1845
Harvesting machine	Erastus C. West	Bradford, Vt.	June 25, 1845
Mowing, reaping machine	Cyrus H. McCormick	Rockbridge, Va.	January 31, 1845
Mowing, reaping machine	Ferdinand Woodward	Upper Freehold, N. J.	September 30, 1845
Planting machine	Enoch Woods	Beloit, Wisconsin Ter'y	January 10, 1845
Plough	Bancroft Woodcock	Wheeling, Va.	January 31, 1845
Plough	Seth J. Roberts	Jeffersonville, Pa.	February 12, 1845
Plough	Ephraim Ball	Greentown, Ohio	February 20, 1845
Plough	Samuel Shearer	Big Prairie, Ohio	July 14, 1845
Plough	William Bullock	Jersey City, N. J.	July 30, 1845
Plough	John Ball	Greentown, Ohio	November 8, 1845
Plough, hill-side	Joseph Trump	Connelsville, Pa.	September 9, 1845
Plough, clevis	Patrick Gallager	Chambersburg, Pa.	Nov. 26, 1845; antedated May 26, 1845.
Plough, wheel	T. B. Quigley and H. Hall	Mansfield, Ohio	October 7, 1845
Sowing machine	Pierpont Seymour	East Bloomfield, N. Y.	May 7, 1845
Smut machine	Joseph Johnson	Wilmington, Del.	Nov. 8, 1845; antedated Septemb'r 9, 1845.
Straw-cutter	Daniel M. Sechler	Wooster, Ohio	February 20, 1845
Straw-cutter	Grey Utley	Chapel Hill, N. C.	September 27, 1845

Threshing machine	J. T. & E. Warren	New York	July 14, 1845
Winnowing machine	Isaac T. Grant	Schaghticoke, N. Y.	July 10, 1845
Winnowing machine	Anthony Cooley	Kalamazoo, Mich.	September 2, 1845

CLASS II.—METALLURGY, AND MANUFACTURES OF METALS AND INSTRUMENTS THEREFOR.

Dies for cutting and forming cultivator teeth	David B. Rogers	Stafford, N. Y.	November 8, 1845
Door-fastenings	Jno. C. Palmer	East Haddam, Conn.	October 7, 1845
Files, machine for cutting	Solomon Whipple	Albany, N. Y.	February 12, 1845
Forge, hot-blast	Paul A. Sabbaton	Reading, Pa.	February 24, 1845
Forks, manufacture of	Samuel H. Gilman	Boston, Mass.	October 16, 1845
Forge, portable	Christian V. Queen	Peekskill, N. Y.	November 18, 1845
Hammer, working forge	George Escol Sellers	Cincinnati, Ohio	January 10, 1845
Hammers	Solomon Anderson	Garretsville, N. Y.	August 20, 1845
Hinges for fastening blinds and shutters	Robert B. Varden	Baltimore, Md.	February 12, 1845
Hoe-necks	Nathan Brand	Leonardsville, N. Y.	April 1, 1845
Knobs for doors	George O. Russell	Middletown, Ct.	October 7, 1845
Latches for doors	Jacob Alrich	Wimington, Del.	May 24, 1845
Lock, door	George Oates	Charleston, S. C.	September 2, 1845
Lock for banks and safes, &c.	John Oxnard	Portland, Me.	April 10, 1845
Lock for banks and safes, &c.	William Hall	Boston, Mass.	October 16, 1845
Locks and keys	Angus McKennon	New York	August 16, 1845
Lock and latch combined	Rhodolphus Kingsley	Springfield, Mass.	April 16, 1845
Lock for safes, &c.	Henry Isham	Montpelier, Vt.	November 12, 1845
Lock for vaults, &c.	Henry C. Jones	Newark, N. J.	April 26, 1845
Metallic cores for pipe boxes	John Huntington	Zanesville, Ohio	February 24, 1845
Ores, iron, method of reducing, &c.	Wm. Neal Clay Assig'd to Wm. Green, jr.	England Woodbridge, N. J.	July 5, 1845
Pipe, lead, machine for making	Nathan Buttrick, jr.	Chelmsford, Mass.	November 8, 1845

K.—LIST OF PATENTS GRANTED DURING THE YEAR 1845—Continued.

Inventions or discoveries.	Patentees.	Residence.	When issued.
Pipes, machine for riveting	Jonathan Ball	New York	December 20, 1845
Pins, machine for heading and pointing	Samuel G. Reynolds	Bristol, R. I.	December 31, 1845
Rivets, machine for making	Horatio G. Reed	Scituate, Mass.	March 12, 1845
Saw filing	Jacob Arndt	Wheeling, Va.	February 24, 1845
Screws, manufacture of	Simeon Brooks and Wm. N. Clark	Chester, Ct.	January 23, 1845
Screws, machine for finishing	Cullen Whipple	Providence, R. I.	July 10, 1845
Sheet-iron, machine for bending	Henry A. Roe	Erie, Pa.	September 11, 1845
Spike machine, (improvement on Burden's patent)	John F. Winslow and Israel Blanchard	Troy, N. Y.	May 10, 1845
Tin-ware, machine for double seaming	Daniel Newton	Louisville, Ky.	December 20, 1845; antedated July 7, 1845.
Tools, machine for grinding	William Hovey	Worcester, Mass.	September 23, 1845
Vice	William H. Taylor and A. P. Norton	Rochester, N. Y. Waterville, N. Y.	May 16, 1845
Wire, machine for beating and cleaning	John J. Howe	Derby, Ct.	December 26, 1845

CLASS III.—MANUFACTURES OF FIBROUS AND TEXTILE SUBSTANCES, INCLUDING MACHINES FOR PREPARING FIBRES OF WOOL, COTTON, SILK, FUR, PAPER, ETC.

Brushes for cotton gins	Edwin Keith	Bridgewater, Mass.	September 9, 1845
Burring machine	Thomas S. Washburn	Lowell, Mass.	October 11, 1845

Burring machine	Alanson Crane	Lowell, Mass.	October 11, 1845
Cloth, felting apparatus	John Andrews	Bellville, N. J.	January 31, 1845
Cotton roving, laying in cans	John Tatham and David Cheetham	Rockdale, England	March 14, 1844, in England; Nov'r 18, 1845, U. S. A.
Cotton wadding, machine for	Oliver Tenny	Dorchester, Mass.	January 10, 1845
Cotton whippers and cleaners	Jane A. Davis, adm'x of Henry G. Davis, dec'd	Clark county, Ala.	May 16, 1845
Carding machine	Hugh Whiteman	Pittsburg, Pa.	February 12, 1845
Gin, cotton saw	Eleazer Carver	Bridgewater, Mass.	January 4, 1845
Gin, cotton and wool	Stephen R. Parkhurst	New York	May 1, 1845
Gin, cotton roller	Theodore Ely	New York	December 11, 1845
Hat-bodies, fabrics for	Isaac L. Chapman	New York	May 1, 1845
Hat-bodies, mode of forming	Marmaduke Osborne	New York	November 11, 1845
Hats, equalizing and polishing nap of	John Lowdon and Thos. Shaw	New York	May 7, 1845
Hats, manufacture of	John N. Genin	New York	July 22, 1845
Hemp-brake	Coleman C. Estes	Maury county, Tenn.	July 14, 1845
Hemp, breaking and cleaning	George W. Billings and John Harrison	Glasgow, Mo.	June 7, 1845
Hemp-dressing machine	George W. Billings and John Harrison	Glasgow, Mo.	May 1, 1845
Hemp, &c., machine	Richard Deering, sen.	Louisville, Ky.	June 10, 1845
Hemp breaker	P. G. Gardiner	New York	February 28, 1845
Hemp and flax breaking and dressing	Benjamin M. Smith	Massillon, Ohio	October 7, 1845
Hemp and flax dressing	William Y. Singleton	Springfield, Ill.	May 7, 1845
Loom, power	James Nield	Taunton, Mass.	March 15, 1845
Loom, power	James Nield	Taunton, Mass.	March 15, 1845
Loom, power	Daniel Barnum	Bridgeport, Ct.	March 26, 1545
Loom, hand, for weaving fabrics	William Townshend	Rochester, N. H.	April 10, 1845
Loom, power, for weaving plaid	Erastus B. Bigelow	Boston, Mass.	April 10, 1845

K.—LIST OF PATENTS GRANTED DURING THE YEAR 1845—Continued.

Inventions or discoveries.	Patentees.	Residence.	When issued.
Looms, operating shuttles of	R. P. Cunningham	Abington, Ct.	December 16, 1845
Looms, stop apparatus for	Enoch Burt	Manchester, Ct.	June 20, 1845
Loom temples	Erastus B. Bigelow	Boston, Mass.	February 24, 1845
Loom warps, regulating tension	Erastus B. Bigelow	Boston, Mass.	March 12, 1845
Loom weaving	Phœnix Manufacturing Company, assignees of Benjamin Slingerland	Paterson, N. J.	April 1, 1845
Paper, manufacturing	Arthur Varnham	London, England	August 9, 1845
Paper, machine for separating sand, &c., from pulp, in the manufacture of	William Bishop	Coventry, Conn.	December 31, 1845
Printing, calico	Alexander Boyd	Providence, R. I.	April 22, 1845
Ropes, making	Charles Durfee, assignee of Edw'd S. Townsend	Palmyra, N. Y.	February 28, 1845
Speeder-fliers	Erastus B. Bigelow	Boston, Mass.	February 24, 1845
Spindle, mode of steadying the live	Alexander Anderson	Paterson, N. J.	November 21, 1845
Spinning, driving bobbins	William Baxter	Paterson, N. J.	September 30, 1845
Throstle for spinning	Benjamin Brundred	Paterson, N. J.	September 9, 1845
Wool, burring and cleaning	Theodore Ely	New York	May 16, 1845

CLASS IV.—CHEMICAL PROCESSES, MANUFACTURES, AND COMPOUNDS, INCLUDING MEDICINES, DYING, COLOR-MAKING, DISTILLING, SOAP AND CANDLE MAKING, MORTARS, CEMENTS, ETC.

Bagasse, drying	George Merrick	New Orleans, La.	April 10, 1845
Bleaching apparatus	Moses Pierce	Norwich, Conn.	November 8, 1845
Blow-pipes, hydro-oxygen	Robert Hare, M. D.	Philadelphia, Pa.	July 5, 1845
Cements, mastic	William H. Chase	Pensacola, Fa.	April 16, 1845
Cements, water-proof	William Y. Singleton	Springfield, Ill.	December 26, 1845
Composition for bearings of machinery	J. S. Hill and Joseph Dixon	Boston, Taunton, Mass.	January 31, 1845
Composition for removing acid, grease, &c., from cloth	Solomon Guess	Boston, Mass.	August 26, 1845
Die-stuffs from spent madder	Frederick Pfanner	Providence, R. I.	September 13, 1845
Gaslight	Benj. F. Coston	Washington, D. C.	January 31, 1845
Gelatine, preparation of portable	Peter Cooper	New York	June 10, 1845
Hemp preparation	Richard Deering, sen.	Louisville, Ky.	June 25, 1845
Hemp preparation	Thomas H. Barlow	Lexington, Ky.	June 25, 1845
Hemp rotting	George W. Billings and John Harrison	Glasgow, Mo.	May 10, 1845
Hose, combination	Horace H. Day	Jersey City, N. J.	August 16, 1845
India rubber, manufacture of	Nelson Goodyear	Newtown, Conn.	April 22, 1845
India rubber fabrics	Nelson Goodyear	Newtown, Conn.	May 13, 1845
India rubber fabrics	Charles Cooper	New York	June 10, 1845
India rubber threads, machine for cutting	Horace H. Day, H. G. Tyre and J. Helm	Jersey City, New Brunswick, N. J.	June 7, 1845
India rubber threads, machine for cutting	James Bogardus	New York	November 21, 1845; antedated May 21, 1845.

K.—LIST OF PATENTS GRANTED DURING THE YEAR 1845—Continued.

Inventions or discoveries.	Patentees.	Residence.	When issued.
India rubber, shirring machine	James Bogardus	New York	November 21, 1845; antedated May 21, 1845.
Ink, printers'	Edward Clark	Brooklyn, N. Y.	July 5, 1845
Lead pipes, method of tinning	R. W. Lowber, assignee of Ward, Selden, and Kneeland	New York	March 12, 1845
Liquids, skimming	Charles Harrival	Baton Rouge, La.	April 26, 1845
Oil from rosin	William T. Clough	Jersey City, N. J.	April 22, 1845
Paints, water-proof	Thomas E. Warren	Troy, N. Y.	March 15, 1845
Plasters, adhesive	William H. Shecut and Horace H. Day	New York	March 26, 1845
Provisions, curing meats	George A. Scherpf	New York	May 7, 1845
Provisions, preparing	D. Lardner & J. Davidson	New York	August 9, 1845
Potatoes, mode of preserving	Charles S. Edwards	Rushville, Ind.	December 31, 1845
Potash, chromate of	Isaac Tyson, jr.	Baltimore, Md.	October 9, 1845
Salt making	James S. O. Brooks	Kanawha, Va.	February 12, 1845
Salt water, separating impurities	Nehemiah P. Stanton	Syracuse, N. Y.	August 20, 1845
Sugar-making	J. De Bretton, sen.	New Orleans, La.	May 24, 1845
Sugar-making	Ethan Campbell	New York	October 25, 1845
Sugar-making	Joseph Francis Lapice, assignee of Charles Louis Derosne	France	Date of foreign patent unknown; July 10, 1845.
Sugar-boilers	Francis Duplessis	Plaquemines, Louisiana	December 16, 1845

CLASS V.—CALORIFIC; COMPRISING LAMPS, FIRE-PLACES, STOVES, GRATES, FURNACES FOR HEATING BUILDINGS, COOKING APPARATUS, PREPARATION OF FUEL, ETC.

Bakers	John T. Davy	Troy, New York	February 12, 1845; antedated August 12, 1844.
Bakers	William Tainter & H. S. Orton	Porter county, Indiana	August 9, 1845
Chimneys, cure for smoky	Augustus Haman	Washington, D. C.	July 22, 1845
Chimneys, cure for smoky	John Plant	Washington, D. C.	November 20, 1845
Furnaces, hot air	Gardner Chilson	Boston, Massachusetts	August 4, 1845; antedated February 4, 1845.
Furnaces, hot air	Adrian Janes	New York	August 9, 1845
Furnaces, air heating	Ebenezer Barrow	New York	December 11, 1845
Furnaces, portable hot air	H. L. B. Lewis	New York	September 19, 1845
Gas burner	William Black	Boston, Massachusetts	August 9, 1845
Grate, parlour	James Wilson	New York	September 13, 1845
Gridirons	Joseph Hawkins	West Windsor, New York	March 26, 1845
Hatters' kettles	Russell Wildman	Hartford, Connecticut	November 8, 1845
Hot water, circulation of	William Beebe	New York	December 16, 1845
Lamps	P. F. Slane & John Golding	East Cambridge, Mass.	January 23, 1845; antedated July 23, 1844.
Lamps for burning lard oil	Andrew Keyser	Fulton, Missouri	August 20, 1845
Lamps regulating draught	E. Whelan	Philadelphia, Pa.	March 26, 1845
Lamp, wicks	Samuel Rust	New York	May 10, 1845; antedated April 4, 1845.

K.—LIST OF PATENTS GRANTED DURING THE YEAR 1845—Continued.

Inventions or discoveries.	Patentees.	Residence.	When issued.
Lamp wicks, tubes for	James Maclean	Philadelphia, Pa.	December 26, 1845.
Oil feeders	Eliphalet S. Scripture	Syracuse, New York	March 15, 1845.
Ranges, cooking	Moses Pond	Boston, Massachusetts	May 29, 1845.
Ranges, cooking	Jordan L. Mott	New York	November, 1, 1845.
Stoves	John Morrison	Newark, New Jersey	March 12, 1845.
Stoves	Samuel Utter	New York	May 1, 1845.
Stoves	Francis L. Heddenburg	New York	May 7, 1845.
Stoves	Jehiel T. Farrand	Port Byron, New York	August 4, 1845.
Stoves	Peter J. Clute	Schenectady, New York	September 19, 1845.
Stoves, air tight	Anson Atwood	Troy, New York	March 26, 1845.
Stoves, ash pit of	William Butcher	Philadelphia, Pa.	November 29, 1845.
Stoves, coal	Henry Stanley	West Poultney, Vt.	January 4, 1845.
Stoves, coal	Charles Babcock	East Haddam, Ct.	June 10, 1845.
Stoves, coal	Jordon L. Mott	New York	November 1, 1845.
Stoves, cooking	Charles Wolf	Cincinnati, Ohio	January 10, 1845.
Stoves, cooking	Robert Wilson	Williamsport, Pa.	February 20, 1845.
Stoves, cooking	John T. Davy	Troy, New York	March 12, 1845.
Stoves, cooking	Gould Thorp	New York	March 26, 1845.
Stoves, cooking	Henry N. Gros	Palatine Bridge, N. Y.	May 13, 1845.
Stoves, cooking	Theophilus Smith	Galway, New York	June 10, 1845.
Stoves, cooking	E. Johnson & D. B. Cox	Troy, New York	July 22, 1845.
Stoves, cooking	Hosea Huntley	Rochester, New York	August 9, 1845.
Stoves, cooking	Low & Leake	Albany, New York	August 20, 1845.
Stoves, cooking	B. T. Roney	Attleborough, Pa.	September 11, 1845.
Stoves, cooking	Charles J. Woolson	Cleveland, Ohio	September 9, 1845.

Stoves, cooking	P. Low, J. B. Choltar, and E. Jones	Troy, New York	November 8, 1845.
Stoves, cooking	R. Peck & J. W. Cochrane	Attica, New York	November 12, 1845.
Stoves, cooking	John Potter	Gettysburg, Pennsylvania	November 18, 1845.
Stoves, cooking	Eli C. Robinson	Troy, New York	November 26, 1845; antedated August 30, 1845.
Stoves, cooking	Samuel Pierce	Peekskill, New York	December 6, 1845,
Stoves, cooking	Samuel Myres	Schenectady, New York	December 31, 1845; antedated August 9, 1845.
Stoves for fire places	H. Katussowski & F. P. Wiezbicki	New York	December 11, 1845.
Stoves, parlour	James Pedder	Philadelphia, Pa.	September 30, 1845.
Stoves, rotary top	Henry Stanley	West Poultney, Vermont	October 25, 1845.
Stoves, portable	C. L. H. Webb	Lockport, New York	December 6, 1845; antedated August 30, 1845.

CLASS VI.—STEAM AND GAS ENGINES, INCLUDING BOILERS AND FURNACE THEREFOR, AND PARTS THEREOF.

Boiler, steam	James Montgomery	Memphis, Tennessee	December 26, 1845.
Boiler, steam, prevent explosions	Cadwallader Evans	Pittsburg, Pennsylvania	February 24, 1845.
Boiler, steam, prevent explosions	William M. Wright	Pittsburg, Pennsylvania	February 24, 1845.
Boiler, steam, magnetic water-gauge	George Faber	Canton, Ohio	November 26, 1845.
Boiler, steam, removing incrustation	Louis Antoine Ritterbandt	Poland	September 11, 1845; date of foreign patent December 2, 1844.

K.—LIST OF PATENTS GRANTED DURING THE YEAR 1845—Continued.

Inventions or discoveries.	Patentees.	Residence.	When issued.
Boiler, steam, safety apparatus	James Montgomery	Memphis, Tennessee	September 2, 1845.
Boiler, steam, safety-valve	Abram Patterson	Rush, Pennsylvania	March 21, 1845.
Locomotive wheels, mode of removing, &c.	Thomas D. Simpson	Norwich, Connecticut	September 30, 1845.
Spark-arrester	Samuel Sweet, jr.	New York	May 13, 1845.
Spark-arrester	William C. Grimes	Philadelphia, Pa.	June 7, 1845; antedated March 1, 1845.
Spark-arrester	William C. Grimes	Baltimore, Maryland	May 13, 1845; antedated January 1, 1845.
Spark-arrester	William C. Grimes	Baltimore, Maryland	September 23, 1845.
Spark-arrester	William Duff	Baltimore, Maryland	September 30, 1845.
Steam engine	R. F. Loper	Philadelphia, Pa.	November 26, 1845.
Steam engine	John Ericsson	New York	December 20, 1845.
Steam engine, auxiliary	John Cochrane	Baltimore, Maryland	April 16, 1845.
Steam engine, connecting cylinder and chest	Frederick E. Sickels	New York	September 19, 1845.
Steam engine, connecting cranks of	Frederick E. Sickels	New York	September 19, 1845.
Steam engine cut-off valves	Frederick E. Sickels	New York	September 19, 1845.
Steam engine cut-off valves	John Cochrane	Baltimore, Maryland	April 16, 1845.
Steam engine cut-off valves	Thomas Rogers	Paterson, New Jersey	May 1, 1845.
Steam engine, reacting rotary	James Black	Williamsport, Pa.	March 12, 1845.
Steam engine, rotary	William Wright	Rochester, New York	September 9, 1845.
Steam engine, vibrating	J. H. Towne	Philadelphia, Pa.	January 10, 1845.
Steam valves	Samuel Tabbott	Richmond, Virginia	February 28, 1845.

CLASS VII.—NAVIGATION AND MARITIME IMPLEMENTS, COMPRISING ALL VESSELS FOR CONVEYANCE ON WATER, THEIR CONSTRUCTION, RIGGING, AND PROPULSION, DIVING DRESSES, LIFE-PRESERVERS, ETC.

Boats and other vessels of sheet iron	Joseph Francis	New York	March 26, 1845.
Booms, saddle and jaws for	James Davis, jr.	Gloucester, Massachusetts	December 26, 1845.
Propeller	Horatio Hubbell	Moyamensing, Pa.	July 14, 1845.
Propeller	Leonard Phleger	Wilmington, Delaware	September 13, 1845.
Propeller, submerged	Samuel B. Howd	Arcadia, New York	June 14, 1845.
Propeller, screw	John Ericsson	New York	September 9, 1845.
Propellers, shipping and unshipping	Stephen R. Parkhurst	New York	November 26, 1845.
Propellers, mode of elevating and depressing	R. F. Loper	Philadelphia, Pa.	November 26, 1845.
Propelling boats and other vessels	Gerret Erkson	Pittsburg, Pennsylvania	March 26, 1845.
Propelling canal boats, &c.	Josephus Echols	Columbus, Georgia	November 26, 1845.
Ships' anchors	N. P. Jones & Jas. Raisbeck	New York	July 5, 1845.
Ships' cables, relieving, &c.	Levi Bissell	Brooklyn, New York	February 28, 1845.
Ships' moorings, &c.	Alexander Mitchell	Belfast, Ireland	April 1, 1845; date of foreign patent July 4, 1843.
Ships, sails for	James Maull	Philadelphia, Pa.	December 11, 1845.
Vessels, attaching keels, &c.	Thomas F. Griffith	New Market, Maryland	April 26, 1845.
Vessels' yards, trusses for	John W. Wilson	Philadelphia, Pa.	December 20, 1845.

CLASS VIII.—MATHEMATICAL, PHILOSOPHICAL, AND OPTICAL INSTRUMENTS, INCLUDING CLOCKS, CHRONOMETERS, ETC.

Clocks	Eli Terry	Plymouth, Connecticut	August 9, 1845.
Clocks, propelling power	Joseph Ives	Bristol, Connecticut	February 24, 1845.

K.—LIST OF PATENTS GRANTED DURING THE YEAR 1845—Continued.

Inventions or discoveries.	Patentees.	Residence.	When issued.
Electro-magnetic telegraph, mode of operating	Ezra Cornell	Ithaca, N. Y.	December 20, 1845
Globes, mounting	Silas Cornell	Rochester, N. Y.	July 5, 1845
Telescope, sub-marine	Sarah P. Mather	Brooklyn, N. Y.	April 16, 1845
Time-keeper, balance for	J. Bliss and F. Creighton	New York	August 4, 1845

CLASS IX.—CIVIL ENGINEERING AND ARCHITECTURE, COMPRISING WORKS ON RAIL AND COMMON ROADS, BRIDGES, CANALS, WHARVES, DOCKS, RIVERS, DAMS, AND OTHER INTERNAL IMPROVEMENTS, BUILDINGS, ROOFS, ETC.

Inventions or discoveries.	Patentees.	Residence.	When issued.
Bridges	Nathan Rider	Worcester, Mass.	November 26, 1845
Bridges, wooden	George W. Thayer	Springfield, Mass.	April 26, 1845
Canal and railroad combined	Samuel S. Walley	Charlestown, Pa.	December 11, 1845
Doors, weather-strips for	A. S. Pelton	Clinton, Conn.	December 16, 1845
Doors and windows, mode of hanging	Aaron B. Carpenter	New York	September 11, 1845
Excavator	Oliver Allen	Norwich, Conn.	May 1, 1845
Excavator, deepening rivers, &c.	Henry McCarty	Pittsburg, Pa.	April 1, 1845
Excavator, ditching machine	Robert Cummings	Lima, Ind.	July 14, 1845
Excavator, ditching and road	Daniel S. Stafford	Rochester, Ill.	June 10, 1845
Gates, balance and sliding	Amon Baker	Western, N. Y.	April 10, 1845
Gates and gateways	Andrew Hood	New York	December 16, 1845
Hydraulic structures	Isaiah W. P. Lewis	Boston, Mass.	May 1, 1845
Raising wrecks of vessels, &c.	Phineas Bennet	New York	September 2, 1845

Rocks, machine for drilling	Hiram H. Scoville	Chicago, Ill.	September 9, 1845
Rock and earth boring apparatus	T. S. Speakman and R. A. Stratton	Philadelphia, Pa.	September 17, 1845
Window sash	C. J. Shirrer and T. W. Cross	Boston, Mass.	March 21, 1845

CLASS X.—LAND CONVEYANCE, COMPRISING CARRIAGES, CARS, AND OTHER VEHICLES USED ON ROADS, AND PARTS THEREOF.

Boxes, anti-friction, for car axles	Thos. Murray Megget, assignee of William Rowan	New Orleans, La. Belfast, Ireland	Oct. 9, 1845; date of foreign patent, Nov. 7, 1844.
Brakes for carriage wheels	William Dunning	Dunningsville, Pa.	November 1, 1845
Brakes for carriage wheels	David D. Gibson and Walter Cobb	Damascoville, Ohio	February 12, 1845
Car bodies, mode of hanging	Levi B. Thyng	Lowell, Mass.	November 18, 1845; antedated May 18, 1845.
Car, railroad, connecting links for	Richard Hemming	Boston, Mass.	October 11, 1845
Car, railroad, replacing upon track	Samuel H. Bean	Philadelphia, Pa.	October 11, 1845
Carriages	John T. Kimball	Kennebunk, Maine	July 22, 1845
Carriage bodies, hanging	Arnold Hosmer	Bath, Ohio	June 2, 1845
Carriage, locomotive, connecting three or more sets of driving wheels	Holmes Hinckley	Boston, Mass.	April 1, 1845
Coaches, steam	James Semple	Alton, Illinois	May 1, 1845
Cart bodies, mode of operating	Thomas Mussey	New London, Conn.	November 1, 1845
Inclined planes, mode of ascending and descending by locomotives, &c.	Ezra Coleman	Philadelphia, Pa.	December 31, 1845
Rails for railroad trucks	W. M. C. Cushman	Albany, N. Y.	January 16, 1845

K.—LIST OF PATENTS GRANTED DURING THE YEAR 1845—Continued.

Inventions or discoveries.	Patentees.	Residence.	When issued.
Railroads	John Elgar	Brookfield, Md.	March 12, 1845
Railway, atmospheric	James Pilbrow	England	July 26, 1845; date of foreign patent, May 17, 1844.
Trucks for railroads	Fowler M. Ray	New York	March 21, 1845
Wheels for carriages	Gershom L. Ackerman	Troy, N. Y.	April 16, 1845; antedated Oct. 16, 1844.
Wheels for carriages, construction of	Eliphalet S Scripture	Syracuse, N. Y.	April 1, 1845
Wheels, railroad car	George W. Eddy	Waterford, N. Y.	December 26, 1845
Wheel-hub, pipe box for	James Jones	Galway, N. Y.	April 1, 1845

CLASS XI.—HYDRAULICS AND PNEUMATICS, INCLUDING WATER WHEELS, WINDMILLS, AND OTHER IMPLEMENTS OPERATED ON BY AIR OR WATER, OR EMPLOYED IN THE RAISING AND DELIVERY OF FLUIDS.

Bellows, double	William Lillie	Edwards, N. Y.	June 2, 1845
Engine, fire	Earnest Morse	New York	December 20, 1845
Filters and refrigerators	Joseph T. Craddock	Baltimore, Md.	December 31, 1845
Pumps	Joseph H. Webster	St. Louis, Mo.	February 28, 1845
Pumps	Frederick Walther	Winchester, Va.	May 1, 1845
Ram, hydraulic	Benjamin S. Benton	Harford, Md.	December 26, 1845
Ram, water	Erastus W. Ellsworth	East Windsor, Ct.	December 6, 1845
Water-wheel	James Gardner	South Lee, Mass.	January 16, 1845

Water-wheel	Chadiah Aylesworth	Bainbridge, N. Y.	March 21, 1845
Water-wheel	John J. Springsteen	Oswego, N. Y.	May 16, 1845
Water-wheel	James Leffel	Springfield, Ohio	May 21, 1845
Water-wheel	Theodore R. Timby	Cato 4 Corners, N. Y.	June 7, 1845
Water-wheel	R. C. Grant	Pomeroy, Ohio	July 26, 1845
Water-wheel	William Dripps	Coatesville, Pa.	November 26, 1845; antedated May 26, 1845.
Water-wheel	John Mecay	Millsborough, Pa.	December 26, 1845
Water-wheel, re-action	Orin W. Seely, (assignee of Joshua Evered	Sodus, N. Y.	July 30, 1845
Water-wheel, re-action	Abner Chapman	Fort Miller Bridge, N. Y.	July 30, 1845

CLASS XII.—LEVER, SCREW, AND OTHER MECHANICAL POWER, AS APPLIED TO PRESSING, WEIGHING, RAISING, AND MOVING WEIGHTS.

Press, cotton	William Bulloch	Jersey City, N. J.	January 4, 1845
Press, cotton	Philos B. Tyler	Philadelphia, Pa.	January 16, 1845
Press, cotton	Joseph Slocum	Syracuse, N. Y.	April 22, 1845
Press, cotton and other	P. G. Gardiner	New York	February 28, 1845
Press, cotton and other	Daniel Gross, assignee of Joseph C. Colt	New York	April 22, 1845
Press, self acting cheese	C. Stone and G. S. Collins	Rootstown & Ravenna, O.	May 29, 1845
Raising and lowering weights	Ephraim Morris	New York	July 5, 1845
Toggle joint, mode of adjusting	S. W. Bulloch	Williamsburg, N. Y.	July 10, 1845

K—LIST OF PATENTS GRANTED DURING THE YEAR 1845.—Continued.

CLASS XIII.—GRINDING-MILLS AND MILL GEARING, CONTAINING GRAIN MILLS, MECHANICAL MOVEMENTS, HORSE-POWER, ETC.

Inventions or discoveries.	Patentees.	Residence.	When issued.
Bark-mill	Anson P. Norton & Morris Owen	Sangerfield, N. Y.	June 25, 1845
Bark-mill	Amos Linsey	Canton, Me.	December 26, 1845
Bark-mill	Milo J. Whiton, assignee of Isaiah Scudder	Broadalbin, N. Y. Plattsville, N. Y.	October 25, 1845; antedated April 25, 1845.
Bolt, flour	Robert Mauck	Honeyville, Va.	December 26, 1845
Coffee-mill	Jesse Fitzgerald	New York	June 25, 1845
Coffee-mill	Beriah Swift	Washington, N. Y.	August 16, 1845
Grinding, corn and cob-mill for	E. A. Knowlton	Columbia, S. C.	February 12, 1845
Grinding, corn and cob-mill for	Jesse Urney	Wilmington, Del.	October 25, 1845
Grinding, corn and cob-mill for	James P. Ross	Lewisburg, Pa.	November 1, 1845
Grinding-mills, &c.	Josiah Platt	Bridgeport, Ct.	December 26, 1845
Grindstones, grinding tools, &c.	Charles Arthur	Keeseville, N. Y.	August 26, 1845
Grist-mill, percussion	Fones McCarthy	Demopolis, Ala.	February 24, 1845
Horse-power	John Haw	Hanover county, Va.	March 15, 1845
Horse-power	Richard Montgomery	Waterville, N. Y.	April 10, 1845
Horse-power, endless floor on	Luke Hale	Hollis, N. H.	January 16, 1845
Horse-power, portable	Elihu H. Jaques	Springfield, Vt.	May 16, 1845
Horse-powers, power and motion of	James Leffel	Springfield, Ohio	August 20, 1845
Mill for hulling cotton seed	Jabez Smith	Petersburg, Va.	March 15, 1845

Mill-stones, prevent from heating	Ferris Freleigh	Stowe, Ohio	March 26, 1845
Mills, wind	George Parker	Corinna, Me.	September 11, 1845

CLASS XIV.—LUMBER, INCLUDING MACHINES AND TOOLS FOR PREPARING AND MANUFACTURING, SUCH AS SAWING, PLANING, MORTISING, SHINGLE AND STAVE, CARPENTERS' AND COOPERS' IMPLEMENTS.

Augers, gimlets, &c.	William N. Clark	Chester, Ct.	January 31, 1845
Augers, handles for	Demmon C. Stone	Warwarsing, N. Y.	March 12, 1845
Barrels, &c., machine for making	William Trapp, jr.	Dryden, N. Y.	October 1, 1845
Boring machine	James B. Coffin	Mohicanville, Ohio	June 20, 1845
Boring machine	Andrew Weikart	Green Village, Ohio	November 1, 1845; antedated May 1, 1845.
Boring machine for grooves, &c.	William Wright	New York	June 10, 1845
Boring machine and mortising	Reuben D. Roys and Newell French	Detroit, Mich.	January 23, 1845
Boring and screw-cutting machine	Aretus A. Wilder	Detroit, Mich.	January 31, 1845
Lathe, turning	James D. Willowby	Gettysburg, Pa.	March 15, 1845
Lathe, turning	Milton W. St. John	Plainfield, N. Y.	May 13, 1845
Lathe, turning irregular forms	Warren Hale and Allen Goodman	Dana, Mass.	July 22, 1845
Lath, machine for cutting	Solomon F. Finch and James Wheeler	Rootstown, Ohio	August 16, 1845
Lath, machine for cutting	Samuel Cherry	Cleveland, Ohio	September 27, 1845
Mortising machine	Charles Bennett	Pepperell, Mass.	September 17, 1845
Oars, machine for turning, &c.	Ezekiel Page	Barcelona, N. Y.	December 20, 1845
Pegs, shoe, machine for making	Thomas A. Robertson	Georgetown, D. C.	August 16, 1845
Pegs, shoe, machine for making and driving	John C. Briggs	Saratoga, N. Y.	October 9, 1845
Planing machine	Reid R. Throckmorton	Brooklyn, N. Y.	May 1, 1845

K.—LIST OF PATENTS GRANTED DURING THE YEAR 1845—Continued.

Inventions or discoveries.	Patentees.	Residence.	When issued.
Planing machine	Benjamin Brown	Burlington, Vt.	October 9, 1845
Planing machine	Joseph E. Andrews	Boston, Mass.	November 21, 1845
Planing machine, fastening cutters	Benjamin Bucknell	Cincinnati, Ohio	March 21, 1845
Planing machine for shingles, &c.	Joseph S. L. Hunt	Boston, Mass.	October 9, 1845
Sash machine	Almon Downs	St. Clair, Mich.	November 8, 1845
Saw-mill carriages	James Dane	West Derby, Vt.	April 22, 1845
Saw-mills, self-setting	Benjamin Webb	Warren, N. Y.	April 1, 1845
Saw-mills, self-setting	Henry Quin	New Alexandria, N. J.	June 25, 1845
Sawing irregular forms	Frederick W. Harris	Lancaster, Mass.	September 27, 1845
Shave, double operating	George R. Tally	Westbrook, N. C.	April 16, 1845
Shingle machine	A. S. Pelton	Clinton, Conn.	October 16, 1845
Stave machine	John Miner and Silas Merrick	Fallstown, Pa.	November 12, 1845
Tenoning machine	James Biggs	New York	November 12, 1845

CLASS XV.—STONE AND CLAY MANUFACTURES, INCLUDING MACHINES FOR POTTERY, GLASS-MAKING, BRICK MAKING, DRESSING AND PREPARING STONE, CEMENTS, AND OTHER BUILDING MATERIALS.

Brick-making	J. Parsons Owen	Cincinnati, Ohio	July 26, 1845
Brick press	John Waite	Leicester, Mass.	March 12, 1845
Brick press	William Sanford	Cambridge, Mass.	September 9, 1845
Glass, pressing in moulds	Joseph Magoun	East Cambridge, Mass.	December 6, 1845

Grindstones. (See Mills, *Class* 14.)			
Marble polishing	J. Eckstein and H. D. Moore, assignees of Jacob Zeigler	Philadelphia, Pa.	March 12, 1845
Pottery ware, manufacture of	Joel Farnam	Stillwater, N. Y.	October 25, 1845
Stone dressing	John C. Dexter	Ionia, Mich.	March 12, 1845
Stone dressing	Jacques Keller, assignee of Daniel Pfister	Switzerland	April 10, 1845; date of foreign patent Dec. 31, 1844.

CLASS XVI.—LEATHER, INCLUDING TANNING AND DRESSING, MANUFACTURE OF BOOTS, SHOES, SADDLERY, HARNESS, ETC.

Boot crimps	Cosman White	Galway, N. Y.	February 12, 1845
Boot crimps	Starr Fairchild, assignee of Reuben Fairchild	Trumbull, Conn.	May 10, 1845
Boot crimps	Cheney Snow and T. N. Sadler	Spencer, N. Y.	May 21, 1845
Boots, machine for crimping	John Young	West Galway, N. Y.	August 26, 1845
Boots, mode of lasting	David Harrington	German Flats, N. Y.	August 26, 1845
Boot patters	Joseph Rider	Wooster, Ohio	June 2, 1845
Buckles, for harness	Kasson Frashure	Manlius, N. Y.	January 16, 1845
Buckles for harness	Kasson Frashure	Manlius, N. Y.	March 25, 1845
Harness, stuffing collars for	Thomas Wiles	Somerset, Ohio	March 21, 1845
Harness, collar for	F. C. Curtis	Columbia, S. C.	August 4, 1845
Harness, stuffing and stretching collars	Wade Haworth	Dayton, Ohio	May 7, 1845
Leather, dicing and polishing	Rufus and Henry Brackett	Boston and Woburn, Mass.	March 15, 1845
Pegging, &c. (*See class* 14.)			
Saddles	Benjamin Suits	Chittenango, N. Y.	August 9, 1845

K.—LIST OF PATENTS GRANTED DURING THE YEAR 1845—Continued.

Inventions or discoveries.	Patentees.	Residence.	When issued.
Saddle springs	John F. Lehr	Huntsville, Ala.	July 5, 1845
Saddle springs	Robert Caldwell	Montevallo, Ala.	May 24, 1845
Shoulder-irons, shoemakers'	James W. Newberry	Kensington, Pa.	February 20, 1845
Straps, fastening leather	Charles F. Beverly	Salem, Ohio	January 16, 1845
Tanning	Simon Snider	Dayton, Ohio	April 10, 1845
Tanning	Francis D. Parmelee	Akron, Ohio	November 1, 1845
Tanning and coloring matter	George C. Close and Edward Field	Port Chester, N. Y.	April 22, 1845

CLASS XVII.—HOUSEHOLD FURNITURE, MACHINES AND IMPLEMENTS FOR DOMESTIC PURPOSES, INCLUDING WASHING MACHINES, BREAD AND CRACKER MACHINES, FEATHER DRESSING, ETC.

Bedstead fastenings	Adin Gaunt, assignee of Ira Smith	Chagrin Falls, Ohio	October 25, 1845
Brushes, filling blocks with bristles for	Samuel Taylor Abbott R. Davis	Cambridge, Mass. Boston, Mass.	May 1, 1845
Chair, eccentric and pivot	Jordan L. Mott	New York	August 20, 1845
Cutting sausage meat	George A. Coffman	Middlebrook, Va.	February 28, 1845
Meat cutters	James M. Wilder	Peterborough, N. H.	May 10, 1845
Refrigerators	Thomas H. King	New York	June 20, 1845
Table, caloric dining	H. L. B. Lewis	New York	September 27, 1845
Tables, extension	Cornelius Briggs	Roxbury, Mass.	September 9, 1845
Washing machine	Harrison Hagans	Brandonsville, Va.	July 5, 1845

Washing machine	Benteen & Zimmerman	Petersburg, Va.	August 26, 1845
Washing machine	Horatio Hoskins	Scipio, N. Y.	August 26, 1845
Washing machine	Grey Utley	Chapel Hill, N. C.	November 26, 1845
Washing machine and churning	Harvey W. Sabine	Rushville, N. Y.	August 16, 1845
Writing-desk and table combined	John White	Marshall, Mich.	November 1, 1845; antedated July 18, 1845.

CLASS XVIII.—ARTS, POLITE, FINE, AND ORNAMENTAL, INCLUDING MUSIC, PAINTING, SCULPTURE, ENGRAVING, BOOKS, PAPER, PRINTING, BINDING, JEWELRY, ETC.

Accordeons, tuning reeds of	M. & Nicklaus Schneider	New Orleans, La.	September 27, 1845
Books, backing, machine for	William Laighton	Portsmouth, N. H.	January 10, 1845
Bugles, keyed, of turtle shell	George W. Shaw	Thompson, Conn.	August 4, 1845
Drawing, instruments for	Erastus W. Ellsworth	East Windsor, Conn.	June 7, 1845
Inkstand	Walter Hunt	New York	May 29, 1845
Inkstand	Augustus T. Arrowsmith, assig'e of Walter Hunt	New York	October 7, 1845
Inkstand	George Arrowsmith, assignee of Walter Hunt	New York	December 11, 1845
Inkstand	Daniel Harrington	Philadelphia, Pa.	November 8, 1845; antedated Sept. 2, 1845.
Piano forte	Samuel R. Warren	Montreal, Canada	July 10, 1845
Piano forte	E. L. Walker, assignee of G. W. Cherry	Carlisle, Pa. Alexandria, D. C.	January 16, 1845
Piano forte	Louis Rueckert	Baltimore, Md.	March 12, 1845
Piano forte	Charles F. Oliver, and G. W. Jackson	Lynn, Mass.	May 1, 1845

K.—LIST OF PATENTS GRANTED DURING THE YEAR 1845—Continued.

Inventions or discoveries.	Patentees.	Residence.	When issued.
Piano forte	Simon W. Draper	Boston, Mass.	June 20, 1845
Piano forte	Edward Badlam	Potsdam, N. Y.	October 25, 1845
Piano forte, bottoms for	William F. Senior	New York	November 21, 1845
Piano forte, Æolian attachment of reeds and mode of adjusting pitch	Charles Horst	New Orleans, Louisiana	September 27, 1845
Pen-holders	Daniel Harrington	Philadelphia, Pa.	September 2, 1845
Printing, anastatic	C. F. Baldamus & F. W. Siemans	Berlin, Prussia	October 25, 1845
Printing, electrographic	A. W. Thompson	Philadelphia, Pa.	April 26, 1845
Printing press	John L. Kingsley	New York	January 4, 1845
Printing press	John C. Kneeland	Troy, New York	February 20, 1845
Printing press	Joseph Saxton	Washington, D. C.	March 21, 1845
Printing press	Joel G. Northrup	Cortlandville, New York	April 26, 1845
Printing press	Richard M. Hoe	New York	May 1, 1845
Reeds, musical	Nathan B. Jewett	Worcester, Massachusetts	December 31, 1845
Ruling machine	Lewis Edwards	Norwich, Connecticut	October 9, 1845
Stencilling	Ezekiel B. Foster	Philadelphia, Pa.	May 13, 1845
Type-casting	David Bruce	Williamsburg, New York	June 7, 1845
Type-casting	Thomas W. Starr	Philadelphia, Pa.	August 4, 1845
Type-setting, cylindrical	Richard Hemming	Boston, Massachusetts	December 16, 1845
Writing machines	Charles Thurber	Norwich, Connecticut	November 18, 1845

CLASS XIX.—FIRE-ARMS, AND IMPLEMENTS OF WAR, AND PARTS THEREOF, INCLUDING THE MANUFACTURE OF SHOT AND GUNPOWDER.

Cannon, wrought iron	Daniel Treadwell	Cambridge, Massachusetts	February 12, 1845
Gun-locks and percussion primers	Edward Maynard	Washington, D. C.	September 22, 1845
Pistols	Ethan Allen	Norwich, Connecticut	April 16, 1845

CLASS XX.—SURGICAL AND MEDICAL INSTRUMENTS, INCLUDING TRUSSES, DENTAL INSTRUMENTS, BATHING APPARATUS, ETC.

Abdominal supporter	L. D. Fleming	Newark, New Jersey	December 31, 1845.
Baths, medicated	Benjamin Sweet	Mt. Morris, New York	December 31, 1845.
Baths, portable	Nelson Bartlett	Belvidere, Illinois	September 23, 1845.
Baths, portable shower	John Cutts Smith	Chelsea, Massachusetts	June 2, 1845.
Bathing apparatus	A. H. Reip, (assignee of W. G. Young)	Baltimore, Maryland	December 16, 1845
Bath, vapor	Thomas S. Lambert	Utica, New York	April 10, 1845
Bath, vapor	Joel H. Ross	New York	April 16, 1845
Exercising machine	James Elliott	Newark, New Jersey	September 2, 1845
Fracture apparatus	Wm. Mills & Mahlon Hoar	New Athens, Ohio	November 8, 1845
Galvanic instruments	Daniel Harrington	Philadelphia, Pa.	September 2, 1845
Galvanic rings	David C. Moorhead	New York	August 26, 1845
Nipples, artificial	Elijah Pratt	New York	August 4, 1845; antedated July 4, 1845.
Nursing bottles	Elijah Pratt	New York	August 9, 1845; antedated June 16, 1845.

K.—LIST OF PATENTS GRANTED DURING THE YEAR 1845—Continued.

Inventions or discoveries.	Patentees.	Residence.	When issued.
Swing for exercise	Joel H. Ross	New York	August 26, 1845
Teeth-setting	John Allen	Cincinnati, Ohio	December 16, 1845
Tooth-extractor	J. W. Baker & W. W. Riley	Columbus, Ohio	November 8, 1845
Truss	David B. W. Hard	Bethlehem, Connecticut	May 16, 1845
Truss, double pads	William R. Goulding	New York	July 5, 1845
Uterine supporter	Ephraim Calvin	North Granville, N. Y.	August 4, 1845
CLASS XXI.—WEARING APPAREL, ARTICLES FOR THE TOILET, ETC., INCLUDING INSTRUMENTS FOR MANUFACTURING.			
Buttons	John Hatch	Attleborough, Mass.	February 20, 1845
Garments, cutting	Sylvanus B. Stilwell	Brooklyn, New York	June 20, 1845
Hats, firemens'	James Brown	Newark, New Jersey	November 1, 1845
Hats, ventilating	George W. Cherry	Alexandria, D. C.	July 26, 1845
Tailors' measure	Abraham A. Bogardus	Newburg, New York	November 29, 1845
Tailors' measure	Allen Ward	Camden, New York	December 26, 1845

CLASS XXII.—MISCELLANEOUS.

Coal-breaker	Benjamin Haywood	Pottsville, Pa.	May 21, 1845
Coal-breaker	William Richardson	Philadelphia, Pa.	September 2, 1845
Combs, machine for dressing	Calvin R. Rogers	Saybrook, Ct.	December 20, 1845
Match splints and arranging	Asa Fessenden and Luke L. Knight	Templeton & Barre, Mass.	April 26, 1845
Seines, knitting	John D. Cornelius and James Mott	Westerly, N. Y.	May 10, 1845
Vault covers	Thaddeus Hyatt	New York	November 12, 1845

List of patents extended by act of Congress approved 4th July, 1836.

Time of renewal.	Patentees.	Inventions.	Date of patent.
February 26, 1845, (by act of Congress,) seven years from December 27, 1849	Wm. W. Woodworth, adm'r of Wm. Woodworth	Planing machine	December 27, 1828
August 21, 1845—seven years from Aug. 23, 1845	James Stimpson	Railroad plates	August 23, 1831
August 21, 1845—seven years from Aug. 23, 1845	James Stimpson	Turning short curves on railroads	August 23, 1831

Reissues of patents granted during the year 1845.

No.	Patentees.	Residence.	Inventions or discoveries.	Date of patent.	Reissued.
	Wm. W. Woodworth, adm'r of Wm. Woodworth	Hyde Park, N. Y.	Planing machine	Dec. 27, 1828	July 8, 1845
75	James Roy & Co.	Troy, N. Y.	Butt hinge	May 17, 1836	August 9, 1845
72	Ezra L. Chapman	Chester, Ct.	Auger twist	July 28, 1838	July 30, 1845
73	Philos, Eli W., and John A. Blake	New Haven, Ct.	Castors	June 30, 1838	July 30, 1845
74	Philos, Eli W., and John A. Blake	New Haven, Ct.	Castors	June 30, 1838	July 30, 1845
77	Samuel Rust	New York	Lamp wicks	May 10, 1845	August 16, 1845

Improvements added to original patents, granted during the year 1845.

No.	Patentees.	Residence.	Inventions or discoveries.	Date of patent.	Reissued.
72	Robin R. Colvin	Columbia, Pa.	Hydrant cock	- - -	January 16, 1845
73	Hezekiah Haynes	Middletown, Vt.	Rakes	- - -	Feb. 12, 1845
74	Herman Wendt	New York	Tailors' shears	- - -	June 2, 1845
75	James P. Gardner	Columbia, Tenn.	Sun dial	- - -	June 7, 1845
76	H. D. Forbes	New York	Bailing water-wheel	- - -	June 14, 1845
77	W. L. Potter	Clifton Park, N. Y.	Cooking stove	- - -	July 5, 1845

Patents granted under the act of Congress approved August 29, 1842, for seven years each.

Patentees.	Residence.	Designs.	When issued.
French, John M., assignee of Calvin Fulton	Rochester, N. Y.	Stove-plate	November 1, 1845
Hine, Charles S.	New York	Stove	May 1, 1845
Jagger, Treadwell, and Perry, assignees of Ezra Ripley	Troy, N. Y.	Ornamental stove	July 14, 1845; antedated April 1, 1845
Johnson, Geer, & Cox, assignees of Ezra Ripley	Troy, N. Y.	Stove	Oct. 16, 1845; antedated Aug. 14, 1845
Joslin Gilman	Boston, Mass.	Stand for globes, &c.	May 7, 1845
Low, Chollar, & Jones, assignees of Ezra Ripley	Troy, N. Y.	Stove	November 12, 1845
Leake, J. S. & F. S. Low, assignees of Addison Low	Albany, N. Y.	Stove	February 12, 1845
Mills, Clark	Charleston, S. C.	Bust of the Hon. J. C. Calhoun	October 7, 1845
Miller, William L.	New York	Umbrella stand	September 13, 1845
Penniman, Elijah P.	Rochester, N. Y.	Stove	September 9, 1845
Peckman, John S. & M.	Utica, N. Y.	Stove	Oct. 16, 1845; antedated Sept. 6, 1845
Ransom, Samuel H.	Albany, N. Y.	Ornamental stove	July 10, 1845
Rathbone & Co., assignees of Addison Low	Albany, N. Y.	Stove	October 7, 1945
Root, David	Cincinnati, Ohio	Stove	September 9, 1845
Starbuck, Benjamin, assignee of Anson Atwood	Troy, N. Y.	Air-tight stove	July 14, 1845
Stone, Henry	Poultney, Vt.	Stove	October 16, 1845
Slane, P. F.	East Cambridge, Mass.	Lamps	March 26, 1845

L.

Alphabetical list of patentees for the year 1845, *with their residence.*

No.	Patentees.	Residence.
4001	Ackerman, Gershom L. - -	Troy, N. Y.
4020	Allen, Oliver - - - -	Norwich, Conn.
3998	Allen, Ethan - - - -	Norwich, Conn.
4313	Allen, John - - - -	Cincinnati, Ohio.
4060	Alrichs, Jacob - - - -	Wilmington, Del.
4155	Anderson, Solomon - - -	Garrettsville, N. Y.
4281	Anderson, Alexander - - -	Paterson, N. J.
4283	Andrews, Joseph E. - - -	Boston, Mass.
3900	Andrews, John - - -	Belleville, N. J.
3927	Arndt, Jacob - - - -	Wheeling, Va.
4160	Arthur, Charles - - -	Keeseville, N. Y.
3975	Atwood, Anson - - -	Troy, N. Y.
3939	Aylesworth, Chadiah - - -	Bainbridge, N. Y.
4077	Babcock, Charles - - -	East Haddam, Conn.
4241	Badlam, Edward - - -	Potsdam, N. Y.
3989	Baker, Arnon - - -	Western, N. Y.
4261	Baker, J. W., and Wm. W. Riley -	Columbus, Ohio.
4239	Baldamus, C. F., and F. W. Siemens	Berlin, kingdom of Prussia.
3918	Ball, E. - - - -	Greentown, Ohio.
4319	Ball, Jonathan - - - -	New York.
4263	Ball, John - - - -	Greentown, Ohio.
4094	Barlow, Thomas H. - - -	Lexington, Ky.
3968	Barnum, Daniel - - -	Bridgeport, Conn.
4301	Barrow, Ebenezer - - -	New York.
4203	Barlett, Nelson - - -	Belvidere, Ill.
4215	Baxter, William - - -	Paterson, N. J.
4232	Bean, Samuel H. - - -	Philadelphia, Pa.
4311	Bebee, William - - -	New York.
4195	Bennett, Charles - - -	Pepperell, Mass.
4177	Bennett, Phineas - - -	New York.
3890	Bennett, James H. - - -	East Bennington, Vt.
4162	Benteen, J. C., and H. W. Zimmerman	Petersburg, Va.
4328	Benson, Benjamin S. - - -	Harford county, Md.
3884	Beverly, Charles F. - - -	Salem, Ohio.
3961	Bicknell, Benjamin - - -	Cincinnati, Ohio.
3925	Bigelow, Erastus B. (No. 2.) - -	Boston, Mass.
3926	Bigelow, Erastus B. (No. 3.) - -	Boston, Mass.
3987	Bigelow, Erastus B. (No. 4.) - -	Boston, Mass.
3940	Bigelow, Erastus B. (No. 5.) - -	Boston, Mass.
4022	Billings, G. W., and John Harrison -	Glasgow, Mo.
4041	Billings, G. W., and John Harrison -	Glasgow, Mo.
4071	Billings & Harrison - - -	Glasgow, Mo.
4341	Bishop, William - - -	Coventry, Conn.

L.—LIST OF PATENTEES—Continued.

No.	Patentees.	Residence.
3932	Bissell, Levi - - - -	Brooklyn, N. Y.
3943	Black, James - - - -	Williamsport, Pa.
4141	Blake, William - - -	Boston, Mass.
73	Blake, Philos, Eli W., and John A. -	New Haven, Conn.
74	Blake, Philos, Eli W., and John A. -	New Haven, Conn.
4043	Blanchard, Israel. (See *Winslow, J. F.*)	Troy, N. Y.
4135	Bliss, John, and Frederick Creighton -	New York.
4280	Bogardus, James - - -	New York.
4278	Bogardus, James - - -	New York.
4294	Bogardus, Abraham A. - -	Newburgh, N. Y.
4010	Boyd, Alexander - - -	Providence, R. I.
3957	Brackett, Rufus and Henry - -	Woburn, Mass.
3980	Brand, Nathan - - -	Leonardsville, N. Y.
4079	Briggs, Joseph D. - - -	Saratoga, N. Y.
4185	Briggs, Cornelius - - -	Roxbury, Mass.
4228	Briggs, John C. - - -	Saratoga, N. Y.
4268	Briggs, James - - - -	New York.
3893	Brooks, S., and W. N. Clark - -	Chester, Conn.
3902	Brooks, James S. O. - - -	Kanawha, Va.
4225	Brown, Benjamin - - -	Burlington, Vt.
4246	Brown, James - - - -	Newark, N. J.
4072	Bruce, David - - - -	Williamsburg, N. Y.
4179	Brundred, James - - -	Paterson, N. J.
3873	Bullock, William - - -	Jersey City, N. J.
4127	Bullock, William - - -	Jersey City, N. J.
4110	Bullock, S. W. - - -	Williamsburg, N. Y.
4300	Burrall, Thomas - - -	Geneva, N. Y.
4088	Burt, Enoch - - - -	Winchester, Conn.
4295	Butcher, William - - -	Philadelphia, Pa.
4259	Buttrick, Nathan, jr. - - -	Chelmsford, Mass.
3921	Cadwallader, Evans - - -	Pittsburg, Pa.
4061	Caldwell, Robert - - -	Montevallo, Ala.
4240	Campbell, Ethan - - -	New York.
4200	Carpenter, Aaron B. - - -	New York.
3875	Carver, Eleazer - - -	Bridgewater, Mass.
4021	Chapman, Isaac L. - - -	New York.
4128	Chapman, Abner - - -	Fort Miller Bridge, N. Y.
72	Chapman, Ezra L., (reissue) - -	Chester, Conn.
3999	Chase, William H. - - -	Pensacola, Florida.
4206	Cheney, Samuel - - -	Cleveland, Ohio.
3888	Cherry, G. W., assignor to E. L. Walker.	
4122	Cherry, G. W. - - -	Alexandria, D. C.
4133	Chilson, Gardner - - -	Boston, Mass.
4260	Chollar, Jones, and Low - -	Troy, N. Y.
4197	Chester, Peter J. - - -	Schenectady, N. Y.
3893	Clark, W. N. (See *Brooks, S.*) -	

L.—LIST OF PATENTEES—Continued.

No.	Patentees.	Residence.
3899	Clark, William N. - - -	Chester, Conn.
4102	Clark, Edward - - -	Brooklyn, N. Y.
4103	Clay, William Neale - - -	England.
4007	Close, Geo. C., and Edw. Field -	Port Chester, Conn.
72	Colvin, Robert R. - - -	Columbia, Pa.
4008	Clough, William T. - - -	Jersey City, N. J.
3907	Cobb, Wm. (See *Gibson, D. D.*) -	Damascoville, Ohio.
4002	Cochrane, John - - -	Baltimore, Md.
4003	Cochrane, John - - -	Baltimore, Md.
4085	Coffin, James B. - - -	Mohicanville, Ohio.
3935	Coffman, Geo. A. - - -	Middlebrook, Va.
4342	Coleman, Ezra - - -	Philadelphia, Pa.
4134	Colvin, Ephraim - - -	North Granville, N. Y.
4006	Colt, J. C. (See *Gross, D.*)	
4343	Colton, Aaron - - -	Pittsfield, Vt.
4115	Commings, Robert - - -	Lima, Ind.
4169	Cooley, Anthony - - -	Kalamazoo, Mich.
4084	Cooper, Peter - - - -	New York.
4039	Cornelius, John D., and James Mott -	Westbury, N. J.
4318	Cornell, Ezra - - - -	Ithaca, N. Y.
3894	Coston, Benjamin F. - - -	Washington, D. C.
4231	Crane, Alanson - - -	Lowell, Mass.
4344	Craddock, Joseph T. - - -	Baltimore, Md.
3963	Cross, T. W. (See *Schirer, C. J.*)	
4308	Cunningham, Robert P. - -	Abington, Conn.
4136	Curtis, F. C. - - - -	Columbia, S. C.
3889	Cushman, William M. C. - -	Albany, N. Y.
4009	Dane, James - - - -	West Derby, Vt.
4345	Davis, James, jr. - - -	Gloucester, Mass.
4027	Davis, A. R. (See *Taylor, S.*)	
4050	Davis, Jane A., administratrix of Henry G. Davis, deceased - - -	Clark county, Ala.
3910	Davy, John T. - - -	Troy, N. Y.
3939	Davy, John T. - - -	Troy, N. Y.
4073	Day, Tyer and Helm - - -	New Brunswick, N. J.
4150	Day, Horace H. - - -	Jersey City, N. J.
3965	Day, H. H. (*See Shecut, W. H.*)	
4059	De Bretton, J. - - - -	New Orleans, La.
4129	Decker, Abraham - - -	Fairfield county, Ohio.
4079	Deering, Richard, senior - -	Louisville, Ky.
4093	Deering, Richard, senior - -	Louisville, Ky.
4108	Derosne, Charles Louis - -	Paris, France.
3941	Dexter, John C. - - -	Ionia, Michigan.
3896	Dixon, Joseph. (*See Hill, J. S.*)	
4262	Downs, Almon - - -	St. Clair, Michigan.
4082	Draper, Simon W. - - -	Boston, Mass.

L.—LIST OF PATENTEES—Continued.

No.	Patentees.	Residence.
4286	Dripps, William - - -	Dunningsville, Pa.
4217	Duff, William - - - -	Baltimore, Md.
4310	Duplessis, Francis - - -	Plaquemines, La.
3934	Durfee, Charles, assignee of Edward S. Townsend - - - -	Palmyra, N. Y.
3937	Ecksteen, John and Henry D. Moore, assignees of Jacob Zeigler - -	Philadelphia, Pa.
4293	Echols, Josephus - - -	Columbus, Ga.
4330	Eddy, George W. - - -	Waterford, N. Y.
4223	Edwards, Lewis - - -	Norwich, Conn.
4337	Edwards, Charles S. - - -	Rushville, Ind.
4320	Eldred, Allen - - - -	Oppenheim, N. Y.
3947	Elgar, John - - - -	Brookville, Md.
4173	Elliott, James - - - -	Newark, N. J.
4070	Ellsworth, Erastus W. - -	East Windsor, Conn.
4296	Ellsworth, Erastus W. - -	East Windsor, Conn.
4054	Ely, Theodore - - -	New York.
4302	Ely, Theodore - - -	New York.
4181	Ericsson, John - - -	New York.
4317	Ericsson, John - - -	New York.
3967	Erkson, Garrett - - -	Pittsburg, Pa.
4114	Estes, Coleman C. - - -	Maury county, Tenn.
4126	Evered, Joshua - - -	Sodus, N. Y.
4288	Faber, George - - - -	Canton, Ohio
4038	Fairchild, R. & S. - - -	Trumbull, Conn.
4242	Farnam, Joel - - - -	Stillwater, N. Y.
4137	Ferrand, Jehiel T. - - -	Port Byron, N. Y.
4013	Fessenden, Asa, and Luke L. Knight -	Barre, Mass.
4147	Finch, S. F., and James Wheeler -	Rootstown, Ohio.
4089	Fitzgerald, Jesse - - -	New York.
4336	Fleming, Lorenzo D. - - -	Newark, N. J.
4045	Foster, Ezekiel B. - - -	Philadelphia, Pa.
76	Forbes, H. D. - - - -	New York.
3974	Francis, Joseph - - -	New York.
3970	Frazer, Kasson - - -	Manlius, N. Y.
3969	Freleigh, Ferris - - -	Stow, Ohio.
	French, Newall. (*See Roys, R. D.*)	
	French, John M., assignee of Calvin Fulton, (design) - - -	Rochester, N. Y.
4292	Gallagher, Patrick - - -	Chambersburg, Pa.
3886	Gardner, James - - -	South Lee, Mass.
3930	Gardiner, P. G. - - -	New York.
3936	Gardiner, P. G. - - -	New York.
77	Gardiner, James P. - - -	Columbia, Tenn.
4118	Genin, John N. - - -	New York.
3907	Gibson, David D., and Walter Cobb -	Damascoville, Ohio.

L.—LIST OF PATENTEES—Continued.

No.	Patentees.	Residence.
4235	Gilman, Samuel H. - - -	Boston, Mass.
	Golding, J. (*See Slane, P. F.*)	
4005	Goodyear, Nelson, (No. 1) - -	Newtown, Conn.
4047	Goodyear, Nelson, (No. 3) - -	Newtown, Conn.
4099	Goodyear, Charles - - -	New Haven, Conn.
4006	Gross, Daniel, assignee of Joseph C. Colt - - - - -	New York.
4095	Goulding, Wm. R. - - - -	New York.
4105	Grant, Isaac T. - - -	Schaghticoke, N. Y.
4125	Grant, Royal C. - - -	Pomeroy, Ohio.
4016	Griffith, Thomas F. - - -	New Market, Md.
4046	Grimes, William C. - - -	Baltimore, Md.
4069	Grimes, William C. - - -	Baltimore, Md.
4205	Grimes, William C. - - -	Baltimore, Md.
4044	Gros, Henry N. - - -	Palatine Bridge, N. Y.
4161	Guess, Solomon - - -	Boston, Mass.
4101	Hagans, Harrison - - -	Brandonville, Va.
3887	Hale, Luke - - - -	Hollis, N. H.
4120	Hale, Warren, and A. Goodman -	Dana, Mass.
4236	Hale, William - - - -	Boston, Mass.
4117	Haman, Augustus - - -	Washington, D. C.
4052	Hard, David B. W. - - -	Bethlehem, Conn.
4104	Hare, Robert, M. D. - - -	Philadelphia, Pa.
4014	Harivel, Charles - - -	Baton Rogue, La.
4211	Harris, Frederick W. - - -	Lancaster, Mass.
4174	Harrington, Daniel - - -	Philadelphia, Pa.
4176	Harrington, Daniel - - -	Philadelphia, Pa.
4258	Harrington, Daniel - - -	Philadelphia, Pa.
4163	Harrington, David - - -	German Flats, N. Y.
	Harrison, John. (*See Billings, G. W.*)	
4170	Harrison, Almond - - -	Blissfield, Mich.
3971	Hart, Silas - - - -	New Haven, N. Y.
3915	Hatch, John - - - -	Attleborough, Mass.
3953	Haw, John - - - -	Hanover county, Va.
3973	Hawkins, Joseph - - -	West Windsor, N. J.
4037	Haworth, Wade - - -	Dayton, Ohio.
73	Haynes, Hezekiah - - -	Middletown, Vt.
4058	Haywood, Benjamin - - -	Pottsville, Pa.
4032	Heddenberg, Francis L. - -	New York.
4233	Hemming, Richard - - -	Boston, Mass.
4313	Hemming, Richard - - -	Boston, Mass.
3896	Hill, Increase S., and Joseph Dixon -	Boston, Mass.
	Hine, Charles S., (design) - -	New York.
3981	Hinkley, Holmes - - -	Boston, Mass.
4080	Hizer, Henry - - - -	Wooster, Ohio.
4025	Hoe, Richard M. - - -	New York.

L.—LIST OF PATENTEES—Continued.

No.	Patentees.	Residence.
4164	Hoskins, Horatio - - -	Scipio, N. Y.
4307	Hood, Andrew - - -	New York.
4065	Hosmer, Arnold - - -	Bath, Ohio.
4210	Horst, Charles - - -	New Orleans, La.
4204	Hovey, William - - -	Worcester, Mass.
4081	Howd, Samuel B. - - -	Arcadia, N. Y.
4324	Howe, John J. - - -	Derby, Conn.
4111	Hubbell, Horatio - - -	Moyamensing, Pa.
4062	Hunt, Walter - - - -	New York.
4221	Hunt, Walter - - - -	New York.
4360	Hunt, Walter - - - -	New York.
4227	Hunt, Joseph S. L. - - -	Boston, Mass.
4152	Huntley, Hosea - - -	Rochester, N. Y.
3929	Huntington, John - - -	Zanesville, Ohio.
4266	Hyatt, Thaddeus - - -	New York.
4096	Isaacs, N. P., and Jas. Raisbeck -	New York.
4270	Isham, Henry - - - -	Montpelier, Vt.
3928	Ives, Joseph - - - -	Bristol, Conn.
4019	Jackson, G. W. (*See Oliver, C. F.*)	
	Jaggar, Treadwell, & Perry, assignees of Ezra Ripley, (design) - -	Troy, New York.
4140	James, Adrian - - - -	New York.
4051	Jaques, Elihu H. - - -	Springfield, Vermont.
4339	Jewett, Nathan B. - - -	Worcester, Mass.
4119	Johnson, Elias, and David B. Cox -	Troy, New York.
	Johnson, Geer, & Cox, assignees of Ezra Ripley, (design) - -	Troy, New York.
3911	Jones, Elias - - - -	Amsterdam, New York.
3984	Jones, James - - - -	Galway, New York.
4011	Jones, Henry C. - - -	Newark, New Jersey.
	Joslin, Gilman, (design) - -	Boston, Massachusetts.
4303	Katussowski, Henry, and F. P. Weizbicki - - - -	New York.
4154	Kayser, Andrew - - -	Fulton, Missouri.
4196	Keith, Edwin - - -	Bridgewater, Mass.
3991	Keller, Jacques, assignee of Daniel Pfister - - - -	Switzerland.
4121	Kimball, John F. - - -	Kennebunk, Maine.
4086	King, Thomas H. - - -	New York.
3874	Kingsley, John L. - - -	New York.
4000	Kingsley, Rhodolphus - -	Springfield, Mass.
3917	Kneeland, J. C. - - -	Troy, New York.
	Kneeland, E. Y. (*See Lober, R. W.*)	
	Knight, Luke L. (*See Fessenden, Asa.*)	
3908	Knowlton, E. A. - - -	Columbia, S. C.
3880	Laighton, William - - -	Portsmouth, N. H.

L.—LIST OF PATENTEES—Continued.

No.	Patentees.	Residence.
3992	Lambert, Thomas S. - - -	Utica, New York.
4168	Lamborn, Israel - - -	Marshallton, Pa.
4144	Lardner, D., and James Davidson -	New York.
4159	Law, Francis L., and John S. Leake -	Albany, New York.
	Leake, J. S., and F. S. Low, assignees of Addison Low, (design) - -	Albany, New York.
4056	Leffel, James - - - -	Springfield, Ohio.
4158	Leffel, James - - - -	Springfield, Ohio.
4100	Lehr, John F. - - - -	Huntsville, Alabama.
4030	Lewis, Isaiah W. P. - - -	Boston, Massachusetts.
4198	Lewis, H. L. B. - - -	New York.
4207	Lewis, H. L. B. - - -	New York.
4066	Lillie, William - - -	New York.
4335	Lindsley, Amos - - -	Canton, Maine.
4285	Loper, R. F. - - - -	Philadelphia, Pa.
4289	Loper, R. F. - - - -	Philadelphia, Pa.
4033	Loudon, John, and Thomas Shaw -	New York.
	Low, Chollar, & Jones, assignees of Ezra Ripley, (design) - -	Troy, New York.
3944	Lowber, Robert W., assignee of Keeland, Selden, & Ward - -	Rochester, New York.
4326	Maclean, James - - -	Philadelphia, Pa.
4297	Magoun, Joseph - - -	East Cambridge, Mass.
4316	Marx, Ernest - - -	New York.
3995	Mather, Sarah P. - - -	Brooklyn, New York.
4329	Mauck, Robert - - -	Honeyville, Virginia.
4305	Maull, James - - - -	Philadelphia, Pa.
4208	Maynard, Edward - - -	Washington, D. C.
3912	McCarthy, Fones - - -	Demopolis, Alabama.
3924	McCarthy, Fones - - -	Demopolis, Alabama.
3978	McCarty, Henry - - -	Pittsburg, Pennsylvania.
3895	McCormick, Cyrus H. - -	Rockbridge, Virginia.
4151	McKinnon, Angus - - -	New York.
4332	Mecay, John - - - -	Millsborough, Pa.
3994	Merrick, George. *(See White, William.)*	
4255	Mills, William, and Mahlon Hoar -	New Athens, Ohio.
	Mills, Clark, (design) - - -	Charleston, S. C.
	Miller, William L., (design) - -	New York.
4267	Miner, John, and Silas Merrick -	Fallstown, Pa.
3986	Mitchell, Alexander - - -	Belfast, Ireland.
3988	Montgomery, Richard - - -	Waterville, New York.
4178	Montgomery, James - - -	Memphis, Tennessee.
4331	Montgomery, James - - -	Memphis, Tennessee.
4314	Moore, Harvey - - -	Reedsville, N. C.
	Moore, H. D. *(See Ecksteen, J.)*	
4167	Moorehead, David C. - - -	New York.

L.—LIST OF PATENTEES—Continued.

No.	Patentees.	Residence.
4097	Morris, Ephraim - - -	New York.
3946	Morrison, John - - -	Newark, New Jersey.
4156	Mott, Jordan L. - - -	New York.
4247	Mott, Jordan L. - - -	New York.
4248	Mott, Jordan L. - - -	New York.
4250	Mussey, Thomas - - -	New London, Conn.
4338	Myers, Samuel - - -	Schenectady, New York.
3916	Newberry, James W. - - -	Kensington, Pa.
4323	Newton, Daniel - - -	Louisville, Kentucky.
3954	Nield, James, (No. 1) - - -	Taunton, Mass.
3955	Nield, James, (No. 2) - - -	Taunton, Mass.
3985	Northrop, Joel G. - - -	Cortlandville, New York.
4053	Norton, A. P. *(See Taylor, W. H.)* -	Waterville, New York.
4090	Norton, A. P., and Morris Owen -	Sangerfield, New York.
4175	Oates, George - - - -	Charleston, S. C.
4019	Oliver, Charles F., and G. W. Jackson	Lynn, Massachusetts.
4275	Osborne, Marmaduke - - -	New York.
4123	Owen, Parsons J. - - -	Cincinnati, Ohio.
3990	Oxnard, John - - - -	Portland, Maine.
4325	Page, Ezekiel - - -	Barcelona, New York.
4229	Palmer, John C. - - -	East Haddam, Conn.
4190	Parker, George - - -	Corinna, Maine.
4023	Parkhurst, Stephen R. - -	New York.
4290	Parkhurst, Stephen R. - -	New York.
4116	Parks, Elias - - - -	Wheatfield, New York.
4253	Parmelee, Francis D. - - -	Akron, Ohio.
3960	Patterson, Abram - - -	Rush, Pennsylvania.
4269	Peck, R., and J. W. Cochrane -	Attica, New York.
	Peckman, John S. & M. (design) -	Utica, New York.
4214	Pedder, James - - -	Philadelphia, Pa.
4312	Pelton, A. S. - - - -	Clinton, Connecticut.
	Penniman, E. P., (design) - -	Rochester, New York.
4192	Pfanner, Frederick - - -	Providence, R. I.
	Pfister, D. *(See Keller, John.)*	
3977	Phenix Manufacturing Company, assignees of Benj. Slingerland -	Paterson, New Jersey.
4193	Phleger, Leonard - - -	Wilmington, Delaware.
4257	Pierce, Moses - - - -	Norwich, Connecticut.
4299	Pierce, Samuel - - -	Peekskill, New York.
4124	Pilbrow, James - - -	Tottenham, England.
4024	Pitts, Hiram A. - - -	Winthrop, Maine.
4279	Plant, James - - - -	Washington, D. C.
4334	Platt, Osiah - - - -	Bridgeport, Connecticut.
4064	Pond, Moses - - - -	Boston, Massachusetts.
4274	Porter, John - - - -	Gettysburg, Pa.
77	Potter, W. L. - - - -	Clifton Park, N. Y.

L.—LIST OF PATENTEES—Continued.

No.	Patentees.	Residence.
4131	Pratt, Elijah - - - -	New York.
4138	Pratt, Elijah - - - -	New York.
4273	Queen, Christian V. - - -	Peekskill, New York.
4222	Quigley, T. B., and Harvey Hall -	Mansfield, Ohio.
4091	Quin, Henry - - - -	New Alexandria, N. J.
4171	Ralston, Andrew - - -	West Middletown, Pa.
	Ransom, Samuel H., (design) - -	Albany, New York.
	Rathbone & Co., assignees of Addison Low, (design) - - -	Albany, New York.
3962	Ray, Fowler M. - - -	New York.
3945	Reed, Horatio G. - - -	Scituate, Massachusetts.
4346	Reynolds, Samuel G. - - -	Bristol, Rhode Island.
4172	Richardson, William - - -	Philadelphia, Pa.
4068	Rider, John - - - -	Wooster, Ohio.
4287	Rider, Nathaniel - - -	Worcester, Mass.
4189	Ritterbandt, Louis Antoine - -	London, England.
3913	Roberts, Seth J. - - -	Jeffersonville, Pa.
4148	Robertson, Thomas A. - -	Georgetown, D. C.
4284	Robinson, Eli C. - - -	Troy, New York.
4340	Robb, James - - - -	Lewistown, Pa.
4187	Roe, Henry A. - - -	Erie, Pennsylvania.
4028	Rodgers, Thomas - - -	Paterson, New Jersey.
4245	Rogers, David B. - - -	Stafford, New York.
4265	Rogers, David B. - - -	Stafford, New York.
4321	Rogers, Calvin B. - - -	Saybrook, Connecticut.
4188	Roney, Benjamin T. - - -	Attleborough, Pa.
	Root, David, (design) - - -	Cincinnati, Ohio.
3996	Ross, Joel H. - - - -	New York.
4166	Ross, Joel H. - - - -	New York.
4249	Ross, James P. - - -	Lewisburg, Pa.
75	Roy, James, & Co. - - -	Troy, New York.
3938	Royer, Jacob - - - -	Uniontown, Maryland.
3891	Roys, R. D., and Newall French -	Detroit, Michigan.
4226	Rowan, William - - -	Belfast, Ireland.
3940	Rueckert, Louis - - -	Baltimore, Maryland.
4220	Russell, George O. - - -	Middletown, Conn.
4040	Rust, Samuel - - - -	New York.
77	Rust, Samuel - - - -	New York.
3922	Sabbaton, Paul A. - - -	Reading, Pennsylvania.
4153	Sabine, Harvey W. - - -	Rushville, New York.
3972	Sanburn, A. - - - -	Carthage, Ohio.
4183	Sanford, William - - -	Cambridge, Mass.
3958	Saxton, Joseph - - -	Washington, D. C.
4035	Scherpf, George A. - - -	New York.
3963	Schirer, C. J., and T. W. Cross -	Boston, Massachusetts.
4212	Schneider, Martin & Niklaus - -	New Orleans, Louisiana.

L.—LIST OF PATENTEES—Continued.

No.	Patentees.	Residence.
4237	Scudder, Josiah - - -	Prattsville, New York.
4180	Scoville, Hiram H., and Enuice Every, administratrix of William Avery, dec.	Des Plains, Illinois.
3952	Scripture, Eliphalet S. - -	Syracuse, New York.
3979	Scripture, Eliphalet S. - -	Syracuse, New York.
3920	Sechler, D. M. - - -	Wooster, Ohio.
3882	Sellers, George Escol - - -	Cincinnati, Ohio.
4029	Semple, James - - -	Alton, Illinois.
4282	Senior, William F. - - -	New York.
4036	Seymour, Pierpont - - -	East Bloomfield, N. Y.
4132	Shaw, George W. - - -	Thompson, Conn.
	Shaw, Thomas. *(See Loudon, J.)*	
4112	Shearer, Samuel - - -	Big Prairie, Ohio.
3965	Shecut, W. H. & H. H. Day - -	New York.
4199	Sickels, Frederick E. - - -	New York.
4201	Sickels, Frederick E. - - -	New York.
4202	Sickels, Frederick E. - - -	New York.
4213	Simpson, Thomas D. - - -	Norwich, Conn.
4034	Singleton, William Y. - - -	Springfield, Ill.
4333	Singleton, William Y. - - -	Springfield, Ill.
3892	Slane, P. F., and John Golding -	East Cambridge, Mass.
	Slane, P. F., (design) - - -	East Cambridge, Mass.
3977	Slingerland, Benj. (*See Phenix Manufacturing Company.*)	Patterson, N. J.
3997	Slocum, Joseph - - -	Syracuse, N. Y.
3951	Smith, Jabez - - - -	Petersburg, Va.
4067	Smith, John Cutts - - -	Chelsea, Mass.
4078	Smith, Theophilus - - -	Galway, N. Y.
4219	Smith, Benjamin M. - - -	Massillon, Ohio.
4243	Smith, Ira - - - -	Chagrin Falls, Ohio.
4057	Snow, Cheney, and T. N. Sadler -	Spencer, Mass.
3993	Snyder, Simeon - - -	Dayton, Ohio.
4194	Speakman, Thomas S., and Richard A. Stratton - - - -	Philadelphia, Pa.
3901	Springsteed, R. H. - - -	Wooster, Ohio.
4055	Springsteen, John J. - - -	Oswego, N. Y.
4107	Stafford, Daniel S. - - -	Rochester, Ill.
3876	Stanley, Henry - - -	Poultney, Vt.
4238	Stanley, Henry - - -	Poultney, Vt.
4157	Stanton, Nehemiah P. - - -	Syracuse, N. Y.
	Starbuck, Benj , assignee of Anson Atwood, (design) - - -	Troy, N. Y.
4130	Starr, Thomas W. - - -	Philadelphia, Pa.
4083	Stilwell, Sylvanus B. - - -	Brooklyn, N. Y.
4049	St. John, Milton W. - - -	Plainfield, N. Y.
3949	Stone, D. C. - - - -	Warwarsing, N. Y.

L.—LIST OF PATENTEES—Continued.

No.	Patentees.	Residence.
	Stone, Henry, (design) - -	Poultney, Vt.
4063	Stone, Chester, and Geo. S. Collins -	Ravenna, Ohio.
4142	Suits, Benjamin - - -	Chittenango, N. Y.
4048	Swett, Samuel, jr. - - -	New York.
4347	Swett, Benjamin - - -	Mt. Morris, N. Y.
4149	Swift, Beriah - - - -	Washington, N. Y.
4272	Suydam, Christopher - - -	Lambertsville, N. J.
4145	Taintor, William, and Harlow Sorton -	Porter county, Ind.
3931	Talbott, Samuel - - -	Richmond, Va.
3982	Talley, George R. - - -	Westbrook, N. C.
4277	Tatham, J., and D. Cheetham -	Rochdale, England.
4027	Taylor, Saml., and A. R. Davis -	Cambridge, Mass.
4053	Taylor, W. H., and A. P. Norton -	Rochester, N. Y.
3881	Tenny, Oliver - - - -	Dorchester, Mass.
4139	Terry, Eli - - - -	Plymouth, Conn.
4004	Thayer, George W. - - -	Springfield, Mass.
4012	Thompson, A. W. - - -	Philadelphia, Pa.
3976	Thorp, Gould - - - -	New York.
4017	Throckmorton, R. R - - -	Brooklyn, N. Y.
4271	Thurber, Charles - - -	Norwich, Conn.
4276	Thyng, Levi B. - - -	Lowell, Mass.
4074	Timby, Theodore R. - - -	Cato 4 Corners, N. Y.
3878	Towne, J. H. - - - -	Philadelphia, Pa.
3934	Townsend, Edward S. (*See Durfee, Charles,*) - - - -	Palmyra, N. Y.
4015	Townshend, William - - -	Rochester, N. H.
4218	Trapp, William, jr. - - -	Dryden, N. Y.
3906	Treadwell, Daniel - - -	Cambridge, Mass.
4186	Trump, Joseph - - -	Connelsville, Pa.
3885	Tyler, Philos B. - - -	Philadelphia, Pa.
4224	Tyson, Isaac, jr. - - -	Baltimore, Md.
4018	Upham, George - - -	Hebron, Ohio.
4244	Urney, Jesse - - - -	Wilmington, Del.
4209	Utley, Grey - - - -	Chapel Hill, N. C.
4291	Utley, Grey - - - -	Chapel Hill, N. C.
4031	Utter, Samuel - - - -	New York.
3903	Varden, Robert B. - - -	Baltimore, Md.
4143	Varnham, Arthur - - -	London, England.
3942	Waite, John - - - -	Leicester, Mass.
3888	Walker, E. L., and G. W. Cherry -	Carlisle, Pa.
4304	Walley, Samuel S. - - -	Charlestown, Pa.
4026	Walker, Frederick - - -	Winchester, Va.
4327	Ward, Allen - - - -	Camden, N. J.
3956	Warren, Thomas E. - - -	Troy, N. Y.
4109	Warren, Samuel R. - - -	Montreal, Canada.
4115	Warren, John T., and Edmund Warren	New York.
4230	Washburn, Thomas C. - -	Lowell, Mass.

L.—LIST OF PATENTEES—Continued.

No.	Patentees.	Residence.
3983	Webb, Benjamin - - -	Warren, N. Y.
3933	Webster, Joseph H. - - -	St. Louis, Mo.
74	Wendt, Herman - - -	New York.
4092	West, Erastus C. - - -	Bradford, Vt.
4087	Wheeler, Clark - - -	Little Valley, N. Y.
3966	Whelan, E. - - - -	Philadelphia, Pa.
3914	Whipple, Solomon - - -	Albany, N. Y.
4106	Whipple, Cullen - - -	Providence, R. I.
3909	White, Cosman - - -	Galway, N. Y.
3994	White, William, assignee of George Merrick - - - -	New Orleans, La.
4252	White, John - - - -	Marshal, Mich.
4251	Wickart, Andrew - - -	Green Village, Ohio.
3904	Wightman, Hugh - - -	Pittsburg, Pa.
3897	Wilder, Aretus A. - - -	Detroit, Mich.
4042	Wilder, James M. - - -	Peterborough, N. H.
4298	Wildman, Russell - - -	Hartford, Conn.
3964	Wiles, Thomas - - -	Somerset, Ohio.
3950	Willoughby, James D. - -	Gettysburg, Pa.
3919	Wilson, Robert - - -	Williamsport, Pa.
4191	Wilson, James - - -	New York.
4322	Wilson, John W. - - -	Philadelphia, Pa.
4043	Winslow, John F. - - -	Troy, N. Y.
3877	Wolf, Charles - - - -	Cincinnati, Ohio.
	Ward, Henry M. (*See Lowber, R. W.*)	
3898	Woodcock, Bancroft - - -	Wheeling, Va.
3879	Woods, Enoch - - -	Beloit, W. T.
4216	Woodward, Ferdinand - -	Upper Freehold, N. J.
	Woodworth, Wm. W., administrator of Wm. Woodworth, deceased; (reissued and extension) - -	Hyde Park, N. Y.
4184	Woolson, C. J. - - -	Cleveland, Ohio.
3923	Wright, William M. - - -	Pittsburg, Pa.
4076	Wright, William - - -	Rochester, N. Y.
4182	Wright, William - - -	Rochester, N. Y.
4165	Young, John - - - -	West Galway, N. Y.

M.—*List of patents expired during the year* 1845.

Names of patentees.	Residence.	Inventions or discoveries.	Date of patent.
Adams, Charles	Boston, Mass.	Couches, sofas, chairs, &c.	April 18, 1831
Alden, Manoah, and Wm. T. Boyd	Northumberland, Pa.	Excavator and self-loading cart	July 20, 1831
Allen, Oliver	Norwich, Conn.	Rotary steam pump engine	November 18, 1831
Alley, Abijah	Cincinnati, Ohio	Bee-hive and management of bees	August 23, 1831
Allen, S. W.	Geneva, N. Y.	Double-acting cylinder pump	July 21, 1831
Aldebert, Joseph G.	Opelousas, La.	Power, &c., for propelling mills	December 29, 1831
Ambler, John, jr., and D. C.	New Berlin, N. Y.	Grist mill	June 13, 1831
Ambler, John, jr.	New Berlin, N. Y.	Mineral and soda water apparatus	June 13, 1831
Ames, D., jr., and John Ames, assignee of Sam. Eckstein	Philadelphia, Pa.	Washing rags	June 13, 1831
Ames, John	Springfield, Mass.	Washing rags	April 6, 1831
Angevine, Caleb	New York	Pendulum churn	February 28, 1831
Anthony, John	Zanesville, Ohio	Plough	February 1, 1831
Andrews, Solomon	Perth Amboy, N. J.	Gas manufacturing from oil	April 15, 1831
Andrews, Solomon	Perth Amboy, N. J.	Gas manufacturing by spirit lamps	May 5, 1831
Antes, Henry	Harrisburg, Pa.	Constructing chimneys	October 24, 1831
Anderson, John F.	Louisville, Ky.	Grist-mill	June 13, 1831
Anderson, Anson	Spencer, N. Y.	Saw-mill dogs	April 26, 1831
Appleton, James	Richmond, Va.	Washing machine	June 13, 1831
Archibald, Wiliam A.	New York	Sugar manufacturing	August 16, 1831
Anthony, David, jr.	Adams, Mass	Horse shoe	April 8, 1831
Arnold, William E.	Chatham, Conn.	Horse or animal power	May 7, 1831

Bacon, R., and William E. Marshall	Walpole, N. H.	Double ovens in chimneys	February 9, 1831
Baker, Joseph	Jefferson township, O.	Medicine	May 5, 1831
Baker, Cyrus	Charleston, N. Y.	Churn	October 6, 1831
Baker, John	Lancaster, Pa.	Draught of chimneys, &c.	October 28, 1831
Balch, William	Anne Arundel Co., Md.	Plough	October 4, 1831
Bailey, Amon	Poultney, Vt.	Churn	October 6, 1831
Barnes, Joel, and N. T. Loomis	Cornwall, Conn.	Corn-shelling	April 13, 1831
Barnes, Aaron	Deerfield, N. Y.	Manufacturing coarse salt	September 25, 1831
Barlow, Peleg	Amenia, N. Y.	Rifles for sharpening edge tools	June 13, 1831
Barlow, Peleg	Amenia, N. Y.	Sharpening edge tools	March 1, 1831
Barron, James, of U. S. N.	Philadelphia, Pa.	Filtering water and other liquids	August 30, 1831
Barron, James, (reissued)	Norfolk, Va.	Fans for bed chambers	June 13, 1831
Barber, Jesse	Sweden, N. Y.	Washing machine	August 30, 1831
Barton, James	Millford, Pa.	Spindle (cast or wrought-iron driver)	April 23, 1831
Bangs, Henry	New York	Cutting beef	April 27, 1831
Basford, Abram	New York	Cushion for billiard-tables	July 20, 1831
Bates, Eli, and D. Updegraff	Mount Pleasant, Ohio	Cooking-stove	July 20, 1831
Beals, Samuel	Mount Pleasant, Ohio	Cooking stove	October 1, 1831
Beckwith, J.	Saratoga, N. Y.	Pumps	April 6, 1831
Beach, Richard M.	Franklin, N. Y.	Boiling liquids of all kinds	April 7, 1831
Beach, Waldren	Philadelphia, Pa.	Threshing machine	November 23, 1831
Bechtler, Christopher	Ruthfordtown, N. C.	Gold washing from gravel sand	October 5, 1831
Bechtler, Christopher	Ruthfordtown, N. C.	Gold washing from sand and pounded ore	October 5, 1831
Bent, Charles, and F. Bush	Chelmsford, Mass.	Composition for stiffening hats, &c.	November 3, 1831
Belt, Rufus	Centerville, Ky.	Bedstead	February 22, 1831
Bigelow, Elisha	Georgetown, D. C.	Grist-mill	February 11, 1831
Billings, B. J., and J. S.	Gorham, N. Y.	Broom-corn, scraping	October 15, 1831
Bill, Asa G., & G. Spalding	Middletown Ct.	Loom for weaving webbing, &c.	March 28, 1831

M.—LIST OF EXPIRED PATENTS—Continued.

Names of patentees.	Residence.	Inventions or discoveries.	Date of patent.
Bishop, Luna	Readsborough, Va.	Bellows	December 22, 1831
Blanchard, Thomas	Springfield, Mass.	Steamboat for passing rapids	March 25, 1831
Black, William	Anne Arundel co., Md.	Plough	October 4, 1831
Boston, Joseph	New York	Manufacturing gas lights, &c.	February 11, 1831
Bond, Ezra	Mendon, N. Y.	Mill for shelling and grinding corn	June 13, 1831
Bond, Ezra	Mendon, N. Y.	Corn-shelling and family mill	June 13, 1831
Bolton, John	Harrisburg, Pa.	Separating clover chaff from the straw	July 28, 1831
Boyden, Seth	Newark, N. Y.	Malleable cast iron	March 9, 1831
Boyden, Seth	Newark, N. J.	Malleable cast-iron	April 6, 1831
Brees, Ezra	Kingston, Pa.	Grist-mill	September 28, 1831
Brown, William	Mooresville, N. Y.	Tanning apparatus	November 2, 1831
Brown, John	Stonington, Ct.	Spinning cotton, &c.	June 13, 1831
Brown, John, and J. Standish	Providence and Cranston, R. I.	Throstle frame and bobbin regulator, spinning	June 13, 1831
Britton, Eben	Little Falls, N. Y.	Bee-hives and management of bees	September 9, 1831
Broughton, Peter	Charleston, S. C.	Winnowing screen, separating grain	August 5, 1831
Bryant, William, and Isaac Hiett	Davidson co., Tenn.	Railroad car	June 13, 1831
Bryent, Walter	Boston, Mass.	Coal cooking-stove	September 13, 1831
Bruff, Benjamin	Rochester, N. Y.	Raising vessels' anchors, &c.	September 13, 1831
Buck, James	Buckport, Me.	Spring catch for doors, &c.	September 28, 1831
Buel, Aaron	Caroline, N. Y.	Cordage tow-line	Decem. 29, 1831
Butterworth, John	Philadelphia co., Pa.	Bending card and can hoops	July 20, 1831
Burganzio, Eugene	New York	Tricylindric water-wheel	November 2, 1831
Bull, Mordecai	Greenwich, N. Y.	Scoop shovel	September 28, 1831

Cairon, John	New York	Distilling	January	10, 1831
Cairon, John	Boston, Mass	Distilling	August	22, 1831
Cande, G., and J. Toucey	Rochester, N. Y.	Threshing machine	April	1, 1831
Carlock, Wiliam	Baltimore, Md.	Stock (for the neck)	August	9, 1831
Carman, Luther	Oxford, Me.	Inclined friction press	April	7, 1831
Carothers, John	Shirleysburg, Pa.	Plough	Decem.	10, 1831
Carpenter, Thomas, 2d	Elmyra, N. Y.	Threshing machine	Septem.	28, 1831
Carriel, George, (reissued)	Manchester, Ct.	Cleaning rags	July	27, 1831
Casey, James R.	New York	Instituting and drawing lotteries	March	5, 1831
Catlen, J., and C. Fletcher	Cincinnati, Ohio	Rotary steam engine	June	13, 1831
Carter, George	Newark, N. J.	Steps for coaches	Novem.	26, 1831
Chase, Mark L.	Baltimore, Md.	Balancing mill-stones	June	13, 1831
Chamberlain, Samuel G.	Philadelphia, Pa.	Securing porcelain teeth	February	11, 1831
Chapman, Harvey	Corinth, N. Y.	Rolling lever carriages	March	24, 1831
Chavalier, N. W.	Baltimore, Md.	Caulking ships and other vessels	Decem.	27, 1831
Chase, Paul	New York	Combustion of anthracite coal	October	7, 1831
Church, Ambrose	Canandaigua, N. Y.	Mineral soda apparatus	July	20, 1831
Cheves, Joshua	Elmyra, N. Y.	Instituting and drawing lotteries	March	28, 1831
Clark, James	Westmoreland co., Pa.	Self-regulating conduit	January	25, 1831
Clark, Adam, jr.	Berne, N. Y.	Saw-trimmer	August	24, 1831
Clark, J., and H. Henderson, (reissued)	Baltimore, Md.	Cutting crackers	June	13, 1831
Clark, Levin	Baltimore, Md.	Railroad car, self-guiding, &c.	Septem.	28, 1831
Clibbon, Edward	Cincinnati, Ohio	House and ship furniture	Septem.	12, 1831
Coe, Elias V.	Warwick, N. Y.	Churning cream by atmospheric air	April	7, 1831
Coleman, Noah H.	Mentz, N. Y.	Mineral water, soda apparatus	July	20, 1831
Colley, John G.	Norfolk, Va.	Marine railway	September	1, 1831
Cole, John, & S. Miller	Washington co., Ohio	Barrels, &c.	Septem.	29, 1831
Conser, John G.	Rebersburg, Pa.	Dressing staves	January	31, 1831
Conser, John G.	Miles township, Pa.	Washing machine	April	21, 1831
Converse, Edward M.	Southington, Ct.	Tin plate-ware	July	20, 1831

M.—LIST OF EXPIRED PATENTS—Continued.

Names of patentees.	Residence.	Inventions or discoveries.	Date of patent.
Cornwell, Abram	Fayette county, Ind.	Tan-yard	November 4, 1831
Coney, Martin	Portland, N. Y.	Water-wheel	April 12, 1831
Cogswell, Osmund	Cincinnati, Ohio	Tanning leather	January 29, 1831
Cook, Calvin W., (reissued)	Lowell, Mass.	Dressing wool and cotton cloth	April 23, 1831
Cooper, Peter	New York	Steam-boiler	October 13, 1831
Cooper, Isaac	Baltimore, Md.	Wheel-boxes for hubs	February 7, 1831
Cooper, Isaac	Baltimore, Md.	Reducing friction of axles, &c.	Septem. 28, 1831
Coolidge, George	Watertown, Mass.	Self-balanced hand-carts	June 13, 1831
Coston, Benton P.	Philadelphia, Pa.	Cutting meat, &c.	June 13, 1831
Cornell, Thomas J.	Randolph, Vt.	Felting and napping hats	February 11, 1831
Coulter, James	Philadelphia, Pa.	Balance for weighing canal boats and loaded wagons	October 13, 1831
Craw, Martin	Rush, N. Y.	Combined steelyards	June 13, 1831
Cram, John S.	Hanover, N. H.	Self-propelling cheese-press	December 27, 1831
Crail, Joseph	Warren, Ohio	Churn	May 5, 1831
Crawford, Ira	Sweden, N. Y.	Threshing machine	July 20, 1831
Crane, Jona	Schenectady, N. Y.	Drilling stone	June 13, 1831
Cross, Fayette	Sweden, N. Y.	Threshing machine	March 8, 1831
Cromelin, Rowland	New York	Mattresses, sofas, &c.	November 7, 1831
Currier, Ebenezer R.	Boston, Mass.	Horizontal piano forte	April 22, 1831
Cushing, Alvin D.	Troy, N. Y.	Percussion lock and walking-cane rifles, pistols, &c.	July 20, 1831
Curtis C., and T. C. Smith	Boston, Mass.	Sheaves, blocks, &c.	April 20, 1845
Cushman, N., and Isaac Loomis	White Hall, N. Y.	Boats for transporting passengers	January 8, 1845

Dart, J. W., and William Webster	Truxton, N. Y.	Water and steam power for mills, &c.	January 21, 1831
Dart, J. W., Willard, and H. Webster	Truxton, N. Y.	Grist-mill	July 20, 1831
Davis, Samuel	New York	Zinc or spelter manufacture	April 18, 1831
Davis, Samuel	New York	Zinc or spelter manufacture	August 11, 1831
Davis, jr., Shadrach	North Dartmouth, Mass.	Removing earth, &c.	February 22, 1831
Davis, Elias	Bangor, Me.	Tub or tread water-wheel	April 9, 1831
Dawkins, Johnston	Westport, Ky.	Threshing machine	November 11, 1831
Dawley, Stafford	Annesville, N. Y.	Double-toothed saw	January 14, 1831
Dawley, Augustus S.	Boston, Mass.	Splitting leather	March 22, 1831
Dawes, Isaac	Goshen farm, Md.	Tanning leather	April 21, 1831
Dean, Oliver, jr., and Joseph Woodhill	Caledonia, N. Y.	Threshing clover seed and grinding corn	April 25, 1831
Dearborn, Nathan H.	Conway, N. H.	Sawing furrow boards	December 28, 1831
Deats, John	Massillon, Ohio	Churn	August 31, 1831
Deering, J. R.	New York	Construction of ships	April 15, 1831
Deitz, John	New York	Horse-shoe	April 22, 1831
Detterich, George, and J. Conger	Tompkins co., N. Y.	Loom for weaving figured cloth	March 12, 1831
Disbrow, Levi	New York	Steam-boiler, combined furnace	February 18, 1831
Dornett, George	Boston, Mass.	Machine for cutting leather	July 20, 1831
Doty, Zuri S.	Massillon, Ohio	Churn	August 31, 1831
Douglass, John C.	New York	Safety steam-boilers	July 21, 1831
Downing, J. M.	Bristol, Pa.	Lime kiln	August 25, 1831
Dyre, T. J., and A. Richmond	New Bedford, Mass.	Candle moulds	July 20, 1831
Eastman, Joel	Bath, New Hampshire	Double chamber rotary steam engine	February 18, 1831
Eastman, Joel	Bath, New Hampshire	Steam bellows	April 8, 1831
Eastman, Joel	Bath, New Hampshire	Applying water to water-wheel	September 28, 1831
Eastman, Joel	Bath, New Hampshire	Water-wheel floats working upon hinges	February 18, 1831

M.—LIST OF EXPIRED PATENTS—Continued.

Names of patentees.	Residence.	Inventions or discoveries.	Date of patent.
Earl, Jesse C.	Baltimore, Maryland	Truss	March 19, 1831
Eaton, Rufus	Concord, N. H.	Saw mill	November 24, 1831
Eldred, Joseph E.	Rochester, N. Y.	Level and plumb	August 25, 1331
Ellis, Elias	Duxbury, Vermont	Gathering and cleaning apples	December 6, 1831
Elliott, Moses	Boscawen, N. H.	Fanning mill	June 13, 1831
Embree, John L.	New York	Purifying whale and sperm oil	June 13, 1831
Emes, Robert	Boston, Mass.	Cleansing leather	November 21, 1831
Emes, Robert	Boston, Mass.	Polishing and diceing morocco	November 21, 1831
Emes, Robert	Boston, Mass.	Polishing and graining morocco	April 20, 1831
Emmons, Uri	New York	Music teaching, &c.	April 7, 1831
Emmons, Calvin	New York	Horse-power	August 2, 1831
Emmons, William	New York	Threshing machine	February 17, 1831
Ely, George	Clarence, New York	Jointing staves	April 14, 1831
Estes, Joel	Brownsville, Tenn.	Power-propelling mills by rolling balance wheel	August 15, 1831
Etheridge, N. G. H., and J. G. Glynn	Little Falls, N. Y.	Corn plough	July 23, 1831
Evans, Thomas, and J. Parsons	New York	Hydrostatic suspension dock	May 13, 1831
Evans, David	Philadelphia, Pa.	Fly-wheel press	August 26, 1831
Ewbank, Thomas	New York	Safety hydrostatic valve	August 27, 1831
Fahrney, Samuel	Boonsborough, Md.	Threshing machine	May 9, 1831
Fahrney, Samuel	Boonsborough, Md.	Cutting sausage meat	February 11, 1831
Fairlamb, J. P., and M. Dunot	Wilmington, Delaware	Cutting crackers	June 13, 1831

Failing, J. R., & G. Nellis	Canajoharie, N. Y.	Saw trimmer	April 27, 1831
Fairbank, E. & T., (reissued)	St. Johnsbury, Vt.	Balance for weighing heavy bodies	June 13, 1831
Fall, John S.	Rattlesnake Springs, Ga.	Cure for epilepsy and dropsy	November 3, 2831
Fay, Josiah	Hollis, New Hampshire	Cutting tenons by revolving cylinders	August 29, 1831
Fitzgerald, Daniel	New York	Cocoanut cutter	December 22, 1831
Ferrin, Otis	Lansingburg, N. Y.	Painting cloth	November 28, 1831
Fletcher, Charles	Boston, Mass.	Chemical water-proof cement	November 18, 1831
Fox, Truman, & W. G. Borland	Little Falls, N. Y.	Threshing machine	February 18, 1831
Foster, Leonard	Boston, Mass.	Mortise door fastener	February 25, 1831
Foster, A., and Wm. Avery	Salina, New York	Reacting steam engine	September 28, 1831
Foster, Willard	Owego, New York	Stump extracting	April 22, 1831
Forbes, Isaac	Bridgewater, Mass.	Jointing staves	August 3, 1831
Forbes, Samuel	New York	Steam boilers and furnaces	March 17, 1831
Fox, David	Ashtabula, Ohio	Moulding brick	August 15, 1831
Foot, Aaron	Williamstown, Mass.	Saving water-power	January 4, 1831
Freeman, Silas, jr.	New Marlborough, Mass.	Grinding apples	March 14, 1831
French, Josiah	Ware, Mass.	Spring beds	August 25, 1831
Fuller, Orlando A.	Vernon, New York	Letting boxes in wheels, &c.	December 21, 1831
Furbush, Webber	Hallowell, Maine	Washing machine	August 19, 1831
Fyler, Orsamus R.	Chelsea, Vermont	Wooden clocks	June 13, 1831
Gambel, William	Baltimore, Maryland	Bedstead	August 25, 1831
Gallup, Lewis F.	Woodstock, Vermont	Lamps, common and argand	March 9, 1831
Geoghegan, C., and James Allen, jr.	Richmond, Va.	Tobacco, manufacturing	December 6, 1831
Genung, Ira	Newark, N. J.	Cutting and punching leather	July 30, 1831
Gentry, Joseph C.	Philadelphia, Pa.	Threshing machine	March 7, 1831
Gillet, Rinaldo P.	Victor, N. Y.	Threshing machine	June 13, 1831
Giraud, John J.	Baltimore, Md.	Propelling vessels by screw	April 29, 1831
Goddard, William	Portsmouth, N. H.	Portable oven	October 12, 1831

M.—LIST OF EXPIRED PATENTS—Continued.

Names of patentees.	Residence.	Inventions or discoveries.	Date of patent.
Goodyear, Charles	Philadelphia, Pa.	Steel-spring fork	September 7, 1831
Goodyear, Charles	Philadelphia, Pa.	Manufacturing of safe-eyed button	January 12, 1831
Gold, Stephen J.	Cornwall, Ct.	Threshing and dressing flax	January 11, 1831
Gordon, E. and D. T.	Oswego, N. Y.	Threshing machine	October 27, 1831
Gordon, Hugh	New York	Steam engine	February 28, 1831
Gorham, Abijah	Turner, Maine	Stump extracting	January 7, 1831
Gorham, William	New Orleans, La.	Excavating canals and ditches	September 5, 1831
Greathouse, William	Mason county, Ky.	Hemp-breaking	July 31, 1831
Green, C. H., and R. Montgomery	Sangerfield, N. Y.	Bark mill	Septemb'r 30, 1831
Greenleaf, Abel	Paris, N. Y.	Rotary steam engine	April 18, 1831
Greenwood, William A.	Palmer, N. Y.	Pointing pegs	February 19, 1831
Gregory, Willson	Richmond, Va.	Washing machine	September 9, 1831
Groning, Randolph	New Orleans, La.	Hair, shaving from deer-skins, &c.	October 10, 1831
Hackley, Philo M.	Herkimer, N. Y.	Boilers for steam engines	December 27, 1831
Hale, John	Hollis, N. H.	Toggle press	April 20, 1831
Hale, Luke	Hollis, N. H.	Hand printing press	December 12, 1831
Hackett, Nathan	Snow Hill, Ohio	Washing machine	August 6, 1831
Hall, John	Hollis, N. H.	Washing machine	April 20, 1831
Hand, Miles B.	Lockport, N. Y.	Washing machine	December 14, 1831
Harrington, Daniel	Philadelphia, Pa.	Ink holder	April 22, 1831
Harrington, Daniel	Philadelphia, Pa.	Exercising invalids in their rooms	April 23, 1831
Harrington, Philip	Petersburg, Pa.	Threshing machine	July 20, 1831
Harrison, George A.	New York	White lead	July 20, 1831
Harman, John, jr.	Upper Wakefield, Pa.	Threshing machine	February 11, 1831

Haslup, Rezin	Baltimore, Md.	Axletrees, hubs, &c.	February 24, 1831
Hasket, Bradbury	Boston, Mass.	Stereotype plates, blocks, &c.	March 8, 1831
Hardy, Alvah	Boston, Mass.	Shears for cutting pasteboard, &c.	August 12, 1831
Hayden, Josiah, jr.	Williamsburg, Mass.	Manufacturing flexible-shank buttons	February 17, 1831
Haywood, Levi	Phelps, N. Y.	Smut machine	April 12, 1831
Heatwoal, G.	Harrisburg, Va.	Shaving hoops	July 27, 1831
Hewitt, Thomas, jr.	Philadelphia, Pa.	Candle moulds	May 4, 1831
Hewitt, Thomas, jr.	Philadelphia, Pa.	Candle moulds	June 13, 1831
Heintzelman, John J.	Philadelphia, Pa.	Gum-elastic pad truss	July 20, 1831
Henderson, James, and C. K. Watson	Zanesville, Ohio	Measuring and cutting garments	October 22, 1831
Hidden, Enoch	New York	Percussion cannon-lock	January 14, 1831
Hidden, Enoch, as'e of S. Ringold and J. P. More	New York	Percussion cannon-lock	December 16, 1831
Hinkley, Benjamin	Fayette, Maine	Washing machine	January 31, 1831
Hinkley, Thomas	Hallowell, Maine	Cleaning chimneys	October 7, 1831
Hinkle, Charles	Lehigh county, Pa.	Elliptic carriage-springs	November 12, 1831
Hinds, Stephen	Montrose, Pa.	Composition for making beer	May 11, 1831
Hitchcock, David	New York	Corn shelling	June 13, 1831
Hetzel, Jacob, and Jesse Bevier	Ithaca, N. Y.	Threshing and shelling corn	February 14, 1831
Hobbs, Jonathan jr.,	Falmouth, Mass.	Sawing shingles	August 18, 1831
Holt, Horace	Rutland township, O.	Loom reeds	October 17, 1831
Holdridge, William	Albany, N. Y.	Drilling stone	November 10, 1831
Hooper, D. H.	New Albany, Ind.	Regulating height of water in steam-boilers	October 31, 1831
Hornback, Simon	Lafayette, Ind.	Sickles for cutting	February 11, 1831
Hortsman, William H.	Philadelphia, Pa.	Fly-nets for horses	July 28, 1831
Howard, William	Baltimore, Md.	Railroad and wagon car	April 23, 1831
Howard, Dean S.	Lyonsdale, N. Y.	Bucket for overshot water-wheel	February 16, 1831
Hoyt, William (reissued)	Vernon, Ind.	Corn shelling	June 13, 1831
Hull, Amos G. (reissued)	New York	Truss	August 17, 1831

M.—LIST OF EXPIRED PATENTS—Continued.

Names of patentees.	Residence.	Inventions or discoveries.	Date of patent.
Hunt, Timothy	Boston, Mass.	Steamboat paddle-wheels	February 17, 1831
Hull, Alonzo G.	New York	Spring beds, elevating and depressing surface	October 1, 1831
Hurd, Merrit	Augusta, N. Y.	Grinding bark	May 3, 1831
Hurd, Merrit	Augusta, N. Y.	Cutting die-woods	July 22, 1831
Hurlbut, Stephen	Glastonbury, Conn.	Bats for hat bodies	February 14, 1831
Hurlbut, Stephen	Glastonbury, Conn.	Hardening hats on a cone	June 13, 1831
Hyde, Stephen	Williamsburg, Mass.	Oval axes	March 2, 1831
Ingham, Samuel D.	New Hope, Pa.	Canal navigation by boats, &c.	April 19, 1831
Irick, Thomas A.	Harrisburg, Va.	Brick press	July 27, 1831
Jacobs, Ruel	Wilton, N. Y.	Sawing boards	February 22, 1831
Jameson, Jacob	Springfield, Ohio	Cutting laths	August 24, 1831
Jennings, Isaiah	New York	Alcohol or spirits from grain	June 13, 1831
Jennings, Isaiah	New York	Light by liquids	June 13, 1831
Jennings, Isaiah	New York	Lamps for burning evaporable ingredients	August 1, 1831
Jennings, Isaiah	New York	Steam-boiler	December 21, 1831
Jennings, Isaiah	New York	Picture, looking-glass background	November 11, 1831
Jencks, James	Sackett's Harbor, N. Y.	Distilling	May 2, 1831
Jinkham, Samuel G.	Enfield, Mass.	Washing machine	June 13, 1831
Johnson, James	Baltimore, Md.	Life-escape and fire ladder	April 18, 1831
Joraleman, R. P., and Isaac Lockman	Northfield, N. Y.	Marine railway	April 16, 1831
Judge, John	Washington, D. C.	Hewing, dubbing, and dressing timber for ships	April 27, 1831
Judge, John	Washington, D. C.	Sticking mouldings on plank	June 13, 1831
Judson, Abel	New Lebanon, N. Y.	Gun lock	June 13, 1831

Kearsing, Thomas, H. O. Kearsing, G. T. Kearsing, and Wm. F. Kearsing	New York	Piano forte	June 13, 1831
Kemball, Philip H.	Salem, Mass.	Lever churn	June 13, 1831
Kempton, James C.	Manayunk, Pa.	Power loom	June 14, 1831
Kendall, Jonas, jr.	Watertown, Mass.	Mould for cutting butt hinges	July 21, 1831
Kendall, William	Fairfield, Maine	Applying water to saw-mills	January 12, 1831
Kendall, William	Fairfield, Maine	Water wheel	January 12, 1831
Kidder, Levi	New York	Water cistern	January 21, 1831
Kilburn, Samuel	Sterling, Mass.	Communicating motion, &c.	April 16, 1831
Kimber, Emmor	Kimborton, Pa.	Locomotive and railroad car	March 5, 1831
Kirk, Josiah W.	Schuylkill county, Pa.	Ornaments from anthracite coal	June 13, 1831
Kirkpatrick, Andrew	Urbana, Ohio	Mixing mortar	November 12, 1831
Klipstine, Philip A.	New Baltimore, Va.	Paint composition	July 20, 1831
Knight, John	Woodbury, N. J.	Scythe snath	April 7, 1831
Knight, John	Woodbury, N. J.	Rifles for sharpening scythes, &c.	April 7, 1831
Knight, Jona.	Stoddard, N. H.	Fireplaces and oven	December 15, 1831
Knowles, Hazard, (reiss'd)	Colchester, Conn.	Wood screw	April 1, 1831
Korn, Henry	Philadelphia, Pa.	Fly-nets for horses	December 8, 1831
Krauser, Samuel	Reading, Pa.	Wheels for railroad cars	November 2, 1831
Lammon, John	Macedon, N. Y.	Horse-power	December 14, 1831
Lane, Eben	Cincinnati, Ohio	Planing boards	October 26, 1831
Lane, Samuel	Hallowell, Maine	Threshing and cleaning wheat	April 6, 1831
Lange, U. B. A.	Philadelphia, Pa.	Stove for stone coal	May 3, 1831
Lester, Eben. A.	Boston, Mass.	Cotton frame gin	January 9, 1831
Linnell, Jona., jr.	Orleans, Miss.	Mixing paint	March 26, 1831
Lawrence, Wm., (reissued)	Meriden, Conn.	Chandelier	March 23, 1831
Lodge, B. F., and E. T. Cox	Zanesville, Ohio	Breaking stone	April 13, 1831
Look, Abel	Pittsfield, Mass.	Cotton gin	January 8, 1831

M.—LIST OF EXPIRED PATENTS—Continued.

Names of patentees.	Residence.	Inventions or discoveries.	Date of patent.
Loring, Daniel	Newark, N. J.	Balance for weighing canal boats and loaded wagons	August 23, 1831
Lowe, John	Whitesborough, N. Y.	Alleviator bedstead	November 21, 1831
Luckey, James	Troy, N. Y.	Washing machine and water heating	November 19, 1831
Mackrell, William H.	Bushwick, N. Y.	Securing window blinds	June 13, 1831
Macomber, Laban L.	Gardiner, Maine	Composition for stiffening hats	January 19, 1831
Macomber, Laban L.	Gardiner, Maine	Manufacture of hats and caps	October 11, 1831
Madison, Channing	Miamisburg, Ohio	Sawing laths	April 4, 1831
Mallory, Asa, and Charles Miles	Concord, Ohio	Cast-iron, uniting with wro't-iron and steel	August 1, 1831
Mapes, James J.	New York	Tobacco-cutting knife	January 22, 1831
Marsh, Henry	Morristown, N. J.	Mortising machine	June 13, 1831
Manning, William	Plainfield, N, J.	Cutting grain	May 3, 1831
Marks, William B.	Petersburg, Va.	Threshing machine	April 8, 1831
Marvin, Dudley	Canandaigua, N. Y.	Excavating scraper	September 2, 1831
Marvin, Dudley	Canandaigua, N. Y.	Inclined-plane excavator	September 2, 1831
Marvin, Dudley	Canandaigua, N. Y.	Furnace for heating tire	January 21, 1831
Mason, Maynadier	Georgetown, D. C.	Iron borings, drillings, &c.	November 8, 1831
Maltby, Benjamin	Gates, N. Y.	Threshing machine	July 30, 1831
Matthews, Alexander	Island Creek, Ohio	Machine for hulling clover seed	December 13, 1831
Matthews, Alexander	Island Creek, Ohio	Distilling and evaporating	June 13, 1831
Mather, Jos. H.	Saybrook, Conn.	Lamps of wood	July 20, 1831
Mathies, J. L. D.	Rochester, N. Y.	Perpetual rotary ovens	December 21, 1831
Mead, William	Newburg, N. Y.	Manufacturing mineral water	April 12, 1831
Metcalf, Chandler	Hanover, N. H.	Composition for paint	February 25, 1831

Merriam, Reuben	Leicester, Mass.	Cut, prick, and set card-teeth	May 2, 1831
Messenger, James W.	Windham, Ohio	Cross-cut sawing machine	December 21, 1831
Meigs, Phineas	Madison, Conn.	Carpenter's plane	February 9, 1831
Mewhinney, Johnson	Liberty township, Ohio	Churn	July 30, 1831
McCormick, Robert, jr.	Augusta county, Va.	Self-stopping grist mill	April 20, 1831
McCormick, Robert, jr.	Augusta county, Va.	Violin and teaching	April 21, 1831
McCormick, Cyrus H.	Rockbridge county, Va.	Hill-side plough	June 13, 1831
McClung, Archibald	Fairfield, Va.	Brick press	March 26, 1831
McGrew, Alexander	Cincinnati, Ohio	Railroad and safety car	June 13, 1831
McKenney, John	West Chester, Ohio	Swing cradle	June 13, 1831
McMullen, John, and J. Hollen, jr.	Huntington county, Pa.	Knitting stockings	March 5, 1831
Michenor, Joseph	Clinton, Ohio	Applying water to water-wheel	March 9, 1831
Millis, Nicholson	New York	Manufacturing of boots and shoes	March 21, 1831
Miller, Timothy	Pittsburg, Pa.	Plough	February 13, 1831
Munroe, Dudley	Windham, N. Y.	Threshing machine	April 14, 1831
Montaudevert, James L.	Charlotte, N. C.	Gold, extracting from ore	April 30, 1831
Morgan, James	Baltimore, Md.	Loom warping	April 5, 1831
Morrison, John	Hardinsburg, Indiana	Hay press	March 12, 1831
Munch, Philip	Putnam, Ohio	Bee-hives and management of bees	July 27, 1831
Mulford, M. D.	Bloomfield, N. Y.	Washing machine	April 5, 1831
Mintzer, Peter	Philadelphia, Pa.	Fly nets for horses	July 20, 1831
Myers, Benjamin	Chambersburg, Pa.	Mill-stones	September 28, 1831
Miller, Lewis S.	Rochester, N. Y.	Cleaning burs from wool	Janury 31, 1831
Narracong, David	Skaneateles, N. Y.	Smut machine	August 18, 1831
Nicholas, Joseph	Lafourche, Louisiana	Mode of destroying insects	June 13, 1831
Newbold, T. G.	Franklin county, Va.	Curing tobacco	Janury 11, 1831
Newbury, John W.	Avon, N. Y.	Accelerating plane	November 15, 1831
Newhall, Jona.	Washington, Maine	Bevel-wheel plane	January 25, 1831
Newhall, John	Dayton, Ohio	Washing machine and press	June 13, 1831
Newsom, T. D.	Nashville, Tenn.	Power propelling machinery	January 22, 1831

M.—LIST OF EXPIRED PATENTS—Continued.

Names of patentees.	Residence.	Inventions or discoveries.	Date of patent.
Newton, Phineas	Sidney Plains, N. Y.	Gumming saw-mill teeth	April 29, 1831
Norton, Isaac	Schuylersville, N. Y.	Threshing machine	January 6, 1831
Nunns, John F.	New York	Piano forte action	May 5, 1831
Osborne, William E.	Brighton, N. Y.	Threshing cylinder and concave	April 30, 1831
Ore, Caleb A.	Philadelphia, Pa.	Manufacturing of boots and shoes	May 5, 1831
Oram, Elizabeth	New York	Globe	January 12, 1831
Otis, Charles	Tunkhannock, Pa.	Distilling apparatus	February 16, 1831
Oxmard, Thomas	Cumberland, Maine	Sirup apparatus	August 6, 1831
Page, George	Keene, New Hampshire	Horse-power	September 28, 1831
Palmer, Nathan	New York	Window blinds	June 13, 1831
Palmer, Green B.	Pendleton, N. C.	Gold, separating from earth	April 23, 1831
Palmer, Isaac S.	Philadelphia, Pa.	Threshing machine	December 6, 1831
Palmer, James P.	Baltimore, Md.	Threshing machine	July 20, 1831
Palmeter, Phineas, jr.	Jamestown, N. Y.	Propelling wheels for boats	April 14, 1831
Parke, Larmon Z., & Iram Brewster	Schoharie, N. Y.	Cutting stone	November 10, 1831
Parker, Jabez, and H. M. Smith	Richmond, Va.	Corn shelling	April 9, 1831
Parker, William A.	Accomack county, Va.	Cure for gout and rheumatism	November 4, 1831
Parce, Ephraim, (reissued)	Lincklean, N. Y.	Potash manufacturing and leaching	July 20, 1831
Parkhurst, Aaron	Scriba, N. Y.	Mixing clay	April 14, 1831
Parkhurst, Aaron, and S. Bacon	Scriba, N. Y.	Power propelling machinery	April 11, 1831
Paterson, John	Warwick, N. Y.	Cupola blast furnace	June 13, 1831
Patridge, John	Zanesville, Ohio	Wooden ware without staves	April 16, 1831
Pawling, A.	Philadelphia, Pa.	Propelling railroad car	March 9, 1831

Payne, Philenzo, and J. Rundell	Port Gibson, Miss.	Cotton press	July 20, 1831
Peebles, Albert	Henry county, Ga.	Double plough	July 20, 1831
Percival, Jos.	Philadelphia, Pa.	Planing boards	July 20, 1831
Prescott, Joseph D.	Chesterfield, Me.	Winnowing grain	July 20, 1831
Philips, William	New Brunswick, N. J.	Horse rake	August 15, 1831
Philips, Benjamin	Philadelphia, Pa.	Paddle wheels and connecting two vessels	June 13, 1831
Phelps, Noble	Turin, N. Y.	Pumps	October 20, 1831
Phipps, J. P., and J. Holliday	Wilmington, Del.	Grist-mill	May 12, 1831
Perkins, Justus	Brutus, N. Y.	Mineral water and soda apparatus	May 3, 1831
Pierce, Nathan	Whitehall, N. Y.	Fire engine	February 23, 1831
Pine, Edward	Troy, N. Y.	Paper cutting machine	July 20, 1831
Piper, Daniel A.	Cincinnati, Ohio	Edging metal plates for roofing houses	August 16, 1831
Porter, Noah	Boston, Mass.	Grist and saw mill combined	November 17, 1831
Post, James R.	New York	Window catch and door fastening	July 21, 1831
Powell, John	Salisbury, N. C.	Gold ores and alluvial auriferous earth washing	April 1, 1831
Prince, John	New York	Inking distributer	December 3, 1831
Pudney, John	Waterford, N. Y.	Marking and cutting garments	September 3, 1831
Pulsifer, John S. and Ebenezer	Ipswich, Mass.	Cheese press	February 14, 1831
Prescott, William	Pottsville, Pa.	Threshing machine	October 25, 1831
Reading, Pierson	Trenton, N. J.	Clover mill	October 25, 1831
Reed, Jesse	Marshfield, Mass.	Corn shelling	September 1, 1831
Reed, Jesse	Marshfield, Mass.	Furnaces for generating steam	January 5, 1831
Reed, Jesse	Marshfield, Mass.	Pumps	August 5, 1731
Reed, Cheney	Worcester, Mass.	Manufacturing shingles	September 28, 1831
Reese, Thomas	Baltimore, Md.	Winnowing grain	July 20, 1831
Redifer, Jacob	Philadelphia, Pa.	Threshing machine	July 25, 1831
Reekers, John J.	Baltimore, Md.	Reducing friction	June 13, 1831

M.—LIST OF EXPIRED PATENTS—Continued.

Names of patentees.	Residence.	Inventions or discoveries.	Date of patent.
Reilly, Boyd	Cincinnati, Ohio	Steam bath, applying	February 5, 1831
Renoir, Alexander	New Orleans, La.	Propelling boats by man-power	July 20, 1831
Revere, John	Boston, Mass.	Metallic composition for sheathing vessels	March 24, 1831
Rice, Levi	Milburn, Mass.	Spinning cotton and wool	November 14, 1831
Richards, Spencer	Cambridge, Mass.	Glass knobs	October 31, 1831
Richards, George H.	Washington, D. C.	Caouchouc fluid	April 11, 1831
Richards, Jedediah	Elbridge, N. Y.	Punching iron and steel	Septem. 28, 1831
Richardson, J. S.	New Market, N. H.	Self acting fire alarm	August 15, 1831
Richardson, J. S.	New Market, N. H.	Steam engine	October 17, 1831
Richardson, Alpha	Boston, Mass.	Splitting leather	April 23, 1831
Richison, Andrew	Newcastle, Ohio	Threshing machine	April 22, 1831
Richmond, Ch., and Saml. Caswell, jr.	Taunton, Mass.	Spades and shovels	April 7, 1831
Robinson, Henry	Boston, Mass.	Gas meters	March 10, 1831
Robbins, J. N.	Troy, Mo.	Parturient invalid bedstead	October 20, 1831
Roe, Stephen C.	New York	Conical stove	March 3, 1831
Rogers, Samuel	Ashville, N. C.	Threshing machine for rice	July 25, 1831
Ross, Tallmage	Pickaway, Ohio	Churn, and working it	January 26, 1831
Rugg, Samuel	Lancaster, Mass.	Revolving harrow	January 11, 1831
Rutherford, Ira W.	Albany, N. Y.	Vertical tooth-extractor	January 4, 1831
Sample, William P.	Bedford county, Tenn.	Cotton-cultivating harrow and scraper	September 3, 1831
Savage, William, and H. Davidson	Horsewell, Ky.	Plough	August 24, 1831
Seger, James S.	New York	Balance weighing machine	July 20, 1831
Seeley, Oran W.	Williamson, N. Y.	Mortar for brick	July 20, 1831

Silliman, Levi	Albany, N. Y.	Preventing chimneys from smoking	July 20, 1831
Sites, John	Harrisburg, Va.	Brick press	March 29, 1831
Sizer, Amasa	Cheshire, Conn.	Coffee and spice mill	December 22, 1831
Scott, John	Philadelphia, Pa.	Glass frames for pictures	April 6, 1831
Shaw, Oliver H.	Richmond, Va.	Art of teaching arithmetic	April 16, 1831
Shaw, Erastus, and R. H. Burke	Canton, Conn.	Axes	November 3, 1831
Sherman, Anson	New York	Printing press	February 26, 1831
Sherman, Levi	Bridgeport, Conn.	Saddle	January 18, 1831
Sherman, Thos. H.	Hastings, N. Y.	Potash manufacturing	February 2, 1831
Sherr, E. N.	Philadelphia, Pa.	Guitar	October 6, 1831
Shugert, John	Pittsburg, Pa.	Punching copper and brass	July 20, 1831
Shepardson, Daniel	Hamilton, N. Y.	Tire and hoop bending	February 7, 1831
Shelter, George	York, Pa.	Screw auger	March 21, 1831
Shull, John	New Petersburg, Ohio	Washing machine	August 19, 1831
Shaffer, Philip	Richmond towns'p, Pa.	Threshing machine	November 16, 1831
Shulz, J. W., and Joel Truel	Medford, Mass.	Construction of lamps	March 19, 1831
Skinner, Elijah	Sandwich, N. H.	Mantels for fireplaces	July 20, 1831
Skinner, Elijah, and John Webster	Sandwich, N. H.	Vertical lath mill	August 26, 1831
Smith, Jacamiah	Morris, N. J.	Saw mill	January 27, 1831
Smith, Lewis T. C.	Scott county, Ky.	Horse shoe	December 15, 1831
Smith, David	Emmetsburg, Md.	Churn	April 21, 1831
Smith, P., and T. H. Arnold	Haddam, Conn.	Corn seeding, &c.	January 21, 1831
Smith, Alonzo L.	Weedsport, N. Y.	Threshing, shelling corn, and grinding apples	April 27, 1831
Smith, Alonzo L.	Brutus, N. Y.	Mineral-water and soda apparatus	June 13, 1831
Sower, Brook W.	Leesburg, Va.	Quilting frame	December 23, 1831
Spencer, Joseph	Canajoharie, N. Y.	Saw, gumming and trimming	August 15, 1831

M.—LIST OF EXPIRED PATENTS—Continued.

Names of patentees.	Residence.	Inventions or discoveries.	Date of patent.
Squires, William H., and Coral C. White	Ledyard, N. Y.	Inclined water-wheel	February 5, 1831
Stimpson, James	Baltimore, Md.	Inclined planes	August 23, 1831
Stimpson, James	Baltimore, Md.	Railroad switches	August 23, 1831
Stimpson, James	Baltimore, Md.	Railroad turn-about	August 23, 1831
Stimpson, James	Baltimore, Md.	Railroad carriages	August 23, 1831
Spencer, Henry	Maryland, N. Y.	Machine for threshing and cleaning smut	November 7, 1831
Starr, William	Norway, N. Y.	Netting for pine-apple cheese	December 27, 1831
Stanton, Nehemiah P.	Syracuse, N. Y.	Horse-power	July 20, 1831
Stewart, James	Boston, Mass.	Hooks and eyes	July 20, 1831
Stackhouse, Powell	Philadelphia, Pa.	Stove	December 22, 1831
Stone, William, jr.	Williams county, Tenn.	Cordage rope	September 8, 1831
Stone, William, jr.	Williams county, Tenn.	Hemp breaking	September 8, 1831
Stillwell, Stephen	Bainbridge, N. Y.	Still and distilling	June 26, 1831
Stewart, James R.	New York	Dieing cotton in the staple	November 11, 1831
Stroble, Daniel, jr.	Washington, D. C.	Sirup and cane juice by steam	May 9, 1831
Stroble, Daniel, jr.	Washington, D. C.	Blowing wind for forge	May 9, 1831
Stoudinger, George	Newark, N. J.	Carriage steel springs	January 11, 1831
Steinhauer, Emma	Philadelphia, Pa.	Cylindrical cooking stove	February 3, 1831
Strode, Jos. E.	East Bradford, Pa.	Reacting water-wheel	February 8, 1831
Stewart, John H.	Philadelphia, Pa.	Standing press	August 11, 1831
Stainford, John	Boston, Mass.	Glass vials	October 17, 1831
Stiles, John S.	Baltimore, Md.	Cutting crackers	August 9, 1831
Stone, William J.	Washington, D. C.	Polishing plates by cylinders	April 30, 1831
Stirupson, Charles, jr.	Boston, Mass.	Bookbinders' cutting press	October 17, 1831

Strong, Elisha	Claridon, Ohio	Percussion side locks for rifles	August 2, 1831
Sullivan, John L.	New York	Pavement, cemented, for streets	October 20, 1831
Sullivan, John L.	New York	Pavement, cemented, for streets	November 9, 1831
Sutton, Thomas	Norwich, Conn.	Rotary pump	January 28, 1831
Sutton, David	Lancaster, Ky.	Hats by steam	June 13, 1831
Summers, Abram W.	Gates, N. Y.	Float-tooth threshing machine	March 21, 1831
Sweet, Samuel, jr.	Readfield, Mass.	Churn	June 13, 1831
Tackels, John G.	Pomfret, N. Y.	Heading, jointing, and dressing staves	July 20, 1831
Taft, Fred. A.	Dedham, Mass.	Manufacturing pasteboards	July 20, 1831
Taylor, Jesse, and J. Woodhead	Middletown, Pa.	Power-loom and stopping	April 21, 1831
Tees, Jacob	Kensington, Pa.	Planing, edging, and grooving boards	June 13, 1831
Thacker, Barnabas, jr.	Barnstable, Mass.	Plough	July 20, 1831
Thomas, William	Farmington, Mich.	Manufacturing shingles	August 25, 1831
Thompson, Jesse	New York	Piano forte action	August 6, 1831
Tibbatts, Lafayette	New Glasgow, Va.	Threshing and cleaning wheat	October 22, 1831
Tibbatts, Lafayette	New Glasgow, Va.	Flax and hemp breaking and dressing	October 22, 1831
Titus, Borroughs	Ulysses, N. Y.	Composition of metals for pipes, &c.	April 19, 1831
Tinkler, Joseph	Massillon, Ohio	Art of pressing	August 31, 1831
Tileston, Wales	Claremont, Mass.	Boots and shoes, soleing, &c.	August 18, 1831
Todd, Henry	Pembroke, N. H.	Corn seeding, &c.	October 1, 1831
Todd, Billy	Marietta, Ohio	Power, propelling mills	August 14, 1831
Tolles, Elisha	Litchfield, Conn.	Pump, suction and lifting	September 28, 1831
Townsend, Edward S., and Philo Durfee	Palmyra, N. Y.	Cordage rope	January 6, 1831
Truman, Jos. M.	Philadelphia, Pa.	Tin-plate, coating with lead	September 29, 1831
Treadwell, Daniel	Boston, Mass.	Spinning hemp, flax, &c.	October 11, 1831
Turner, Samuel	Aurelius, N. Y.	Threshing machine	January 11, 1831
Turner, William A.	Washington co., N. C.	Preventing the explosion of steam-boilers	May 15, 1831
Turner, William A.	Washington co., N. C.	Preventing the explosion and burning of steam-boilers	April 6, 1831

M.—LIST OF EXPIRED PATENTS—Continued.

Names of patentees.	Residence.	Inventions or discoveries.	Date of patent.
Turner, William A.	Washington co., N. C.	Steam-engine machinery	July 21, 1831
Turner, John	Augusta, Maine	Reacting water-wheel	January 18, 1831
Tufts, Otis	Boston, Mass.	Printing press	July 30, 1831
Tufts, Otis	Boston, Mass.	Hand printing press	November 7, 1831
Tuck, Davis G.	Halifax C. H., Va.	Curing tobacco	February 15, 1831
Tyson, Nathan	Baltimore, Md.	Kiln-drying flour	August 3, 1831
Tuthill, Daniel L.	New York	Hatters' furnace for heating irons	November 8, 1831
Underwood, Silas	Hardwick, Vermont	Circular wedge	July 22, 1831
Underwood, Silas	Hardwick, Vermont	Circular wedge for saw mill	July 22, 1831
Van Akin, James, 2d	Knox, New York	Churn	September 28, 1831
Van Doren, Isaac	Hopewell, New York	Threshing machine	June 13, 1831
Van Doren, Isaac	Hopewell, New York	Portable horse-power	June 13, 1831
Van Loan, William W.	New York	Steam navigation	January 15, 1831
Van Tuyle, John Y.	Rahway, New Jersey	Horizontal wind wheel	September 28, 1831
Vanderslick, Thomas	Philadelphia, Pa.	Metallic plates, adjusting to artificial teeth	January 5, 1831
Varela, Felix	New York	Wheels, easy motion and pavement saving	July 20, 1831
Vosburg, John	Kinderhook, New York	Threshing machine	July 20, 1831
Waggenet, Edward M.	Adair county, Ky.	Bar-share plough	January 12, 1831
Warren, Edmund	New York	Threshing machine	April 28, 1831
Wallace, James	Rochester, New York	Moulds for shaping timbers of boats	August 9, 1831
Waters, Asa	Millbury, Mass.	Propelling wheels for boats	April 30, 1831
Watson, David	Fayette, Maine	Washing machine	December 23, 1831
Warrington, Jos., and William Scaterford	Philadelphia, Pa.	Pessaries	September 5, 1831
Weed, Henry	Sandwich, N. H.	Portable grist mill	January 10, 1831

Weed, Henry, and S. Fellows	Sandwich, N. H.	Smut machine	August 23, 1831
Welford, R., and J. H. Deas	Philadelphia, Pa.	Carpenters' plane	May 14, 1831
West, Uel, and Daniel Loring	New York	Balance	August 23, 1831
West, Joshua S.	Portland, New York	Threshing machine	April 19, 1831
Werneway, Lewis	Harper's Ferry, Va.	Self-directing railroad car	November 16, 1831
White, Elihu, assignee of M. D. Mann and S. Surdevant	New York	Vertical type caster	January 7, 1831
White, Elihu, assignee of G. W. Grater	New York	Stereotype extendible blocks	January 7, 1831
White, Elihu, assignee of S. Sturdevant	New York	Machine for smoothing type	January 7, 1831
White, John	South Union, Ky.	Washing machine and churn	April 11, 1831
White, Samuel	Chambersburg, Pa.	Machine for hulling and cleaning clover seed	August 10, 1831
Whiteman, Asa, and Joel Baker	Walpole, Mass.	Spinning and roping cotton	July 20, 1831
Whittaker, Welcome	Troy, New York	Skates	December 30, 1831
Williams, Thomas	Rochester, New York	Scraping flesh and hair from hides	October 31, 1831
Williams, William	Buckingham, Pa.	Machine for hulling and cleaning clover seed	August 12, 1831
Wickwire, Ezra	Alexander, New York	Threshing machine	September 28, 1831
Wilson, Increase	New London, Conn.	Door knockers	March 11, 1831
Willis, Oscar	Burke county, N. C.	Gold machine, called railway car	December 21, 1831
Wilcox, Richard	Paterson, N. J.	Metallurgical operations	April 5, 1831
Wilcox, Richard	Paterson, N. J.	Metallurgical operations with anthracite coal	April 5, 1831
Wilcox, Richard	Paterson, N. J.	Metallurgical operations with bituminous, &c. coal	April 5, 1831
Wilcox, Philip	Springfield, Mass.	Baker and roaster	September 28, 1831
Williston, Gordin	New London, Ct.	Tin baker	January 11, 1831
Wilkinson, Garner	White Creek, N. Y.	Axletrees, hub, and spokes	December 6, 1831

M.—LIST OF EXPIRED PATENTS—Continued.

Names of patentees.	Residence.	Inventions or discoveries.	Date of patent.
Winans, Ross	Baltimore, Md.	Axletrees for carriages, &c.	July 20, 1831
Wood, William J.	Rochester, N. Y.	Threshing machine	April 19, 1831
Wooley, John	New York	Turning edges of tin and copper	March 16, 1831
Wood, James	Philadelphia, Pa.	Cast-iron rollers for laminating and flattening metal	July 20, 1831
Woodworth, William	New York	Fur cleaning	April 19, 1831
Wooster, David S.	Sheldon, N. Y.	Spinning wool	February 14, 1831
Woolson, Thomas	Claremont, N. H.	Stove	July 20, 1831
Wooley, William	New York	Bedstead and hospital chair	September 28, 1831
Wooley, William	New York	Secret bedstead for sofas, &c.	October 3, 1831
Wolf, Andrew	Pittsburg, Pa.	Door lock	April 18, 1831
Wright, Lemuel U.	London, England	Regulating heat by machinery	August 25, 1831
Wright, Lemuel U.	London, England	Distilling	September 28, 1831
Wright, Lemuel U.	London, England	Sugar manufacturing	August 25, 1831
Wykoff, Peter	Westport, Ky.	Lever power and inclined wheel	July 20, 1831
Whittemore, Herald	Worcester, Mass.	Clapboards from round logs	August 26, 1831
Yale, Ebenezer R.	Hyde Park, N. Y.	Rotary steam-engine	June 13, 1831
Yemans, Jos.	Ashtabula, Ohio	Grist-mill	March 18, 1831
Zimple, Charles F.	New Orleans, La.	Railroad car running on single rail	October 15, 1831

N.

CLAIMS OF PATENTS ISSUED DURING 1845.

No. 3873.

What I claim as my invention, and desire to secure by letters patent, is the combination of levers K K with the side links P P, with chains Q Q passing over rollers R R, having vertical links to support the movable platen E E. I also claim the invention of the arrangement for connecting the self-adjusting platen to the machinery, by which the power is applied to the press; so that whenever it takes beyond a limited amount of power to propel the press, the simple action of the power in propelling the press will release the bale until only the given amount of power is required.

And I also claim the invention of the arrangement for connecting the above arrangement for adjusting the power upon the bale to the movable platen of the press, substantially in the manner and for the purposes set forth.

WM. BULLOCK.

No. 3874.

Having thus fully described the nature of my invention, and shown the whole construction and operation of my machine, what I claim therein as new, and desire to secure by letters patent, is the arrangement of the gripers, combined with the carrying belts, by which I am enabled to carry in the paper, hold it, retain it until it is perfected, by being printed on both sides, and then deposite it; these operations being effected by so combining the sheet-apparatus with the inking rollers as to give to the carrying belts and gripers an intermitting progressive movement, as described.

I also claim, in combination with the printing apparatus, the so arranging of the carrying belts as to return the sheets of paper which have been printed on one side at nearly the same level which they occupied when they received the first impression, they being in both cases at the proper elevation for giving the impression as described.

I claim likewise the manner in which the grippers are made to open and close by means of a spring, operating like that marked *f*, to force and hold them open, and a bolt for holding them when closed, in combination with the closer and opener, substantially as set forth.

J. L. KINGSLEY.

No. 3875.

Having thus described my improvement and its advantages, I now claim as my invention, and desire to secure by letters patent, the combination of a cylinder brush, having fans on the end thereof, with a cotton-gin, for purposes and in the manner herein set forth, or in any manner substantially the same.

ELEAZER CARVER.

No. 3876.

Having thus fully described the manner in which I construct my coal-burner, and shown its operation as resulting from the particular combination of its respective parts, what I claim therein as new, and desire to secure by letters patent, is the manner in which I have combined and arranged the two stories thereof, consisting of two cylinders, with the eight triangular, radiating flues arranged around and in contact with them; said flues communicating with the flue space in the plinth, with intermediate chamber, and with the cornice space, as described; the two latter being divided by partitions into anterior and posterior portions, in the manner and for the purpose set forth; and there being also openings, such as are herein described and represented, through the upper end of the upper cylinder into the cornice space, in the manner and for the purpose above made known; it being distinctly understood that I do not make any claim to either of the individual parts, taken separately and alone, but that I limit my claim to the combination and arrangement thereof as a whole; not intendng, however, by this claim, to confine myself, in constructing my stove, to the particular form of the respective parts, as described and represented, but to vary these as I may deem expedient, whilst I attain the same end by means substantially the same.

HENRY STANLEY.

No. 3877.

What I claim as my invention, and desire to secure by letters patent, is, the two horizontal flues *o* in combination with the oven, their bottom plates forming part of the top of the oven; their inner plates forming partly two sides of the same; their top plates being formed by the hearth plate F, and their outside plates by the side plates B and B of the stove. I do not claim, merely, to conduct the heat all round the oven, but I do claim the peculiar arrangement of the flues to effect the said object, as hereinabove described.

CHARLES WOLF.

No. 3878.

Having thus fully described the nature of my improvements in the vibrating cylinder steam engine, and shown the operation thereof, what I claim therein as new, and desire to secure by letters patent, is the manner in which I have arranged the same, so as to connect two piston rods, proceeding from one piston, to two driving shafts, for the purpose of turning them simultaneously in opposite directions, as set forth.

I likewise claim, in combination with the two piston rods, the connecting of one of them to one of the crank pins by means of a link or equivalent device, allowing of the amount of lateral motion necessary to enable both the cranks to revolve with perfect freedom.

I do not claim the passing of two piston rods through the two heads of a piston as in itself new, this having been previously done; but I limit my claim to the combination and arrangement by which I effect the object that it was the purpose of this invention to accomplish, as set forth, and applied to the vibrating cylinder steam engine.

J. H. TOWNE.

No. 3879.

The invention claimed and desired to be secured by letters patent, is the combination of the apparatus for dropping or planting potatoes with the apparatus for ploughing the ground, opening the drills, and covering the seed, as described.

ENOCH WOODS.

No. 3880.

Having thus fully described the nature and construction of my machine for backing books in the process of binding, what I claim therein as new, and desire to secure by letters patent, is the manner, herein described, of causing the backs of such books to be carried along against a fluted roller, or a block of metal, whilst they are confined between the jaws of what I have herein denominated the backing irons; the respective parts of said machine being arranged and operating substantially as herein fully made known.

WILLIAM LAIGHTON.

No. 3881.

My invention, and therefore what I claim, consists in the manner in which I effect the drying of the sized bat without the employment, in the drying apartment, of chain aprons or conveyors, such as are generally used therein, viz: By means of the long vertical apartments, S, (for the reception of the bat and hot air,) and (in combination with) a passage or flue, *a*, (for the discharge of the air in a current) proceeding from the upper part thereof; the same being arranged with respect to the size rollers, and the bat being carried through the said passage and into the hot air apartment, and out of the latter through a passage (*b*) or outlet, and received and wound upon a beam, substantially as herein before set forth.

In testimony whereof, I have hereunto set my signature this third day of December, A. D. 1844.

OLIVER FENNY.

No. 3882.

Having thus fully described the manner in which I construct my vertical forge-hammer apparatus, and shown the operation of the respective parts thereof, what I claim therein as new, and desire to secure by letters patent, is the manner of operating upon the lifting rod, by means of the friction drums, one of which is made to advance to and recede therefrom by being placed on a sliding frame, which is operated upon by a toggle joint, under an arrangement of parts substantially the same with that herein described.

I also claim the manner of arranging the respective levers O and P, the catch *d*, the cam wheels M, and their appendages, so as to be operated upon by the lines and chain attached to the said levers, substantially as herein fully made known.

And I do hereby declare that I do not intend by these claims to limit myself to the precise form and deposition of the respective parts of said

machine, but to vary these as I may think proper, whilst I attain the same end by equivalent means.

GEO. ESCOL SELLERS.

No. 3883.

What I claim as my invention, and desire to secure by letters patent, is the construction and use, for all similar purposes with other buckles, of the following parts of my angular box, and grooved roller buckle, to wit: Said *grooved roller* moving upon the *grooved surface* of the back section of the angular box, and the manner of its attachment to said back section by means of a *loop* or *ring*, and a *slide*, so that the same retain its place, and act upon the strap required to be held by pressing it against the *bridge* or front section of said angular box, and any and everything essentially the same; all other parts of said buckle being disclaimed as like or similar to those of other buckles now in common use.

KASSON FRASHURE.

No. 3884.

What I claim as my invention, and which I desire to secure by letters patent, is the before described method of fastening together the ends of straps and other articles by a combined hinged convex lever, and serrated plate, and adjustable sliding bar, whether constructed and arranged in the manner set forth, or other mode substantially the same.

CHARLES F. BEVERLY.

No. 3885.

What I claim and desire to secure by letters patent, is the arrangement of the sectors and double rack piston rod in combination with the follower of the press, by means of the connecting rods, to adapt the movement of the platen or follower to the increased resistance of the cotton, and thus attain the greatest amount of effect with the least expenditure of power, as described.

PHILOS B. TYLER.

No. 3886.

What I claim as my invention, and which I desire to secure by letters patent, is the manner in which I construct my water-wheel; that is to say, the form of the buckets having two distinct curves; one of the curves projecting beyond the periphery of the wheel into spiral shutes, the curves on the face and back of the buckets corresponding; and in combination therewith, the openings in the bottom of the spiral shútes for the discharge of the water.

JAMES GARDNER.

No. 3887.

Having thus set forth my invention, I shall claim the mode of firmly uniting together, by one screw bolt, the several parts of the three links (B,

C, C,) and the floor-board, viz: by a combination of ears (*d*, *e*,) cast upon the inner sides of the two portions of the link B, so as to lap over each other, and permit the screw-bolt to pass through them, and operate upon and with respect to the several parts, as described.

In testimony whereof, I have hereunto set my signature, this third day of December, A. D. 1844.

LUKE HALE.

No. 3888.

Having thus fully described the improvements, what we claim therein as new, and desire to secure by letters patent, is an extra set of hammers, weights, or dampers, or a continuous bearing, constructed and arranged as herein described; passing over the centres of the strings of a piano forte, so as to be brought down upon them by a pedal or other analogous device, for the purpose of producing the harmonious tones, as herein set forth.

E. L. WALKER,
G. W. CHERRY.

No. 3889.

I am aware that cast-iron base rails have been capped with wrought-iron rails, and therefore I do not claim this as my invention; but what I do claim as new, and desire to secure by letters patent, is connecting the cap rails with the base rails, by means of a fillet, flanch, or rebate, as herein described, so that, by breaking joints, the base and cap rails will be retained in their proper lines at the joints, and the cap rail may be extended up to or beyond the inner edge of the base rail, and thus prevent the flanches of the wheels from acting against the base rail, as described.

WM. M. C. CUSHMAN.

No. 3890.

Now, what I claim as my invention, and desire to secure by letters patent, is the manner of grasping the standing flax, for the purpose of pulling it, between the fingers or jaws, by means of the movable part sliding in the clamps and receiving its motion in the direction of the handles from the crank-knob, by means of a slot and pin, or toggle joint, as above set forth and described.

JAMES H. BENNET.

No. 3891.

Having thus fully described our machine, what we claim therein as new, and desire to secure by letters patent, are as follows, to wit: We claim the combination in the mandrel of a rotary motion for the purposes of boring and drilling, with a vertical motion for the purpose of mortising; the mandrel taking both motions in the former operations, and the vertical only in the latter.

REUBEN D. ROYS,
NEWELL FRENCH.

No. 3892.

Having thus fully described our improvement, we wish it to be understood that we do not claim, as our invention, combining the bowl of a lamp with the stem thereof, by blowing it on, as that has before been done; but what we do claim is combining the mould for the bowl of the lamp, constructed substantially as herein before set forth, with the horizontal shelf *d*, (into which the top of the foot of the lamp is fitted,) and the platform *a*, *a*, on which said foot rests, by which the connexion or cementing of the bowl and foot is accomplished in a truer and more perfect manner than it can otherwise be done; the whole arrangement being substantially as herein before specified.

In testimony that the foregoing is a true description of our said invention and improvement, we have hereunto set our signatures, this second day of May, in the year eighteen hundred and forty-four.

P. F. SLANE,
JOHN GOLDING.

No. 3893.

What we claim as our invention or improvement, and desire to secure by letters patent, is as follows: 1. In the machine for paring the head of the screw, we claim as our invention or improvement the combination of the two levers (C and K) with the spring (*r*,) by which the blank is removed from the jaws of the spindle after the paring of the head is completed, as above described and set forth.

2. In the machine for nicking or scoring the screw, we claim as our invention the lever (*e*) to which the face-plate *(f)* is attached, in combination with the lever (*o*) and trip-lever, (*h*,) for the purpose and in the manner described; and these, thus combined, we also claim in combination with the lever (H) for re-engaging the trip lever, (*h*,) as described.

3. In the machine for threading the screw, we claim as our invention or improvement the manner of combining the gauge (12) that operates the slide (22) with the spindle, by means of the lever and lifting rod, (3,) in manner substantially as described.

SIMEON BROOKS,
WILLIAM N. CLARK.

No. 3894.

Having thus fully described my inventions, what I claim therein as new, and for which I desire to secure letters patent, is—

1st. I claim the method of introducing the resin, or fat, into the retort, by means of the feeder G, and pipe H, and tube H′, as above described, directly on to the coke or other charge in the retort, whereby the disadvantages arising from the collection of sediment in the ordinary syphon tube are obviated, and the resin or oil is introduced into the hottest part of the retort without any portion coming in contact with the sides.

2d. I claim the jacket around the pipe J, that conveys the gas to the condenser, in combination with the cistern of the gasometer, in the manner and for the purpose described; thus keeping the pipe J cool, and preventing the tar from baking on to said pipe.

3d. I claim the combination of a condenser, constructed and arranged as above made known, with the retort and gasometer, for the purposes herein specified, to condense the gas that passes through it, and having a cistern below to draw the tar into.

4th. I claim constructing the gas burner in the manner described, and having a long double tube, with a conical chamber above it, as herein specified, so as to heat the gas to a high temperature before burning.

Lastly, I claim the mercurial joint, constructed and arranged substantially as set forth for passing gas from a stationary to a revolving pipe, as herein before explained.

BEN. F. COSTON.

No. 3895.

I claim, 1st, the curved (or angled downward, for the purpose described) bearer, for supporting the blade, in the manner described.

2d. I claim the reversed angle of the teeth of the blade, in manner described.

3d. I claim the arrangement and construction of the fingers, (or teeth for supporting the grain,) so as to form the angular spaces in front of the blade, *a s*, and for the purpose described.

4th. I claim the combination of the bow L, and dividing iron M, for separating the wheat, in the way described.

5th. I claim setting the lower end of the reel post R behind the blade, curving it at R, and leaning it forward at top, thereby favoring the cutting and enabling me to brace it at top by the front brace S, as described, which I claim in combination with the post.

CYRUS H. McCORMICK.

No. 3896.

What we claim as our discovery, and desire to have secured by letters patent, is the composition or compound metal formed by the admixture of the above specified proportions of *zinc* and of the "*hardening*" composition above described, whether tin be *superadded* in the proportions stated or not.

INCREASE S. HILL,
JOSEPH DIXON.

No. 3897.

Having thus fully described my improvement, what I claim as my invention, and desire to secure by letters patent, is the combination of the lever (J) and dogs (K and I) with the nut G, and shaft, (L) for stopping the nut and throwing the wheel (T) out of gear, as herein set forth.

ARETUS A. WILDER.

No. 3898.

Having thus fully described the nature of my improvements on my plough, and shown how the same are carried into operation, what I claim therein as new is the manner in which I have given stability to the respective parts of my plough, by securing the same together by the means herein

set forth; that is to say, by the combination of the staple and wedge D and *c*, of the projections *e e*, on the point of the hooked knob *f*, and its wedge *h*, arranged and connected with the other parts as set forth, by which arrangement and connexion of the respective parts I leave those parts which are to bear the main strain and shocks in a form which insures the necessary strength and prevents them from moving out of their places.

I do not pretend to claim the use of hooks, mortises, or wedges, as such, but limit my claim, as above set forth, to the particular manner in which I have arranged these in my improved plough.

BANCROFT WOODCOCK.

No. 3899.

What I claim as my improvement, and desire to secure by letters patent, is the mode of making the single twist ship auger, the bit and gimlet, with the upper inner surface A of the twist, *concave*, as above described, and for the object set forth.

WILLIAM N. CLARK.

No. 3900.

Having thus fully described the nature of my improvements in the machinery or apparatus for manufacturing cloth by felting, and shown the manner in which the same operates, what I claim therein as new, and desire to secure by letters patent, is the manner herein described and represented of combining and arranging the steam box H, with its perforated top, the second steam box H′ in the rear thereof, and the reciprocating platen or rubber by which it is surmounted, so as to co-operate in the process of felting, in the manner herein set forth.

It will be manifest that a single steam box might be made to answer the purpose of the two, but the two are preferred as being less cumbrous, more easily made, and answering the purpose better than one of double size.

JOHN ANDREWS.

No. 3901.

Having thus fully described my improvements, I wish it to be understood that I do not claim a cultivator with the side beams of the frame movable, nor do I claim the spreading or contracting seed planters, or the extension of shafts, as described in my machine, as it has been before used for various purposes; but what I do claim as my invention, and desire to secure by letters pattent, is the arrangement of the ploughs, as herein described, by means of the curved side pieces of the frame; said side pieces being made so that they can be expanded for the purposes herein set forth.

I also claim, in combination with the above, the shaft *m*, constructed so as to extend as herein described, combined with and operating the slides in the hoppers. I further claim the construction of the lock of the plough as herein described, so as to fasten all of the parts by hooking the land side into the cutter, as described.

R. H. SPRINGSTEED.

No. 3902.

Having thus fully described my invention, and the operation of the same, I would remark that I do not claim applying heat to the surface of the brine for the purposes of crystalizing the salt, as that has before been done; but I confine my claim to the mode herein described of applying the heat to the surface of the brine as that surface rises or falls, by means of the revolving or floating pipe *b*, constructed and operating substantially as herein described. Its advantages are two fold. First, preserves a low degree of heat in all parts of the cistern. Second, is a convenient mode of preventing the currents in the lower strata of brine.

J. S. O. BROOKS.

No. 3903.

What I claim as my invention, and desire to secure by letters patent, is the arrangement of the bolt or pin E, in combination with the wings D, and perforated segments G G 2, and plate L, on one-half of the hinge, or on the shutter, by which means the shutter or blind can be fastened and held in any position corresponding with the holes or wings, as described.

R. B. VARDEN.

No. 3904.

What I claim as my invention is the dispensing with the main cylinder of the common carding machine, by so disposing of the licker in and workers and strippers around the lower part of the circumference of the doffer, and giving them such motion, as to deliver to and receive from the doffer itself without the aid of the main cylinder.

HUGH WIGHTMAN.

No. 3906.

What I claim as my invention, in the foregoing specification, is this, viz: I have invented a new and improved kind of cannon, which is formed of a series of rings, or short hollow cylinders, joined together by their ends in sufficient number to form the length required for the cannon, and for this I claim letters patent.

DANIEL TREADWELL.

No. 3907.

What I claim as our invention, and desire to secure by letters patent, is the mode of operating the brake by means of the body sliding on the frame, and connected with the levers of the brake, in combination with the mode of removing the brake from the wheels by connecting it with the swingletree, substantially as herein described.

DAVID D. GIBSON.
WALKER COBBS.

No. 3908.

Having thus fully described my improvements in grinding corn and cobs, &c., I wish it to be understood that I do not claim the cutting or breaking

of the same, as that has before been done by knives or other similar apparatus; but what I do claim as my invention, and which I desire to secure by letters patent, is the inclined recess outside the inclined plane, and the end of the shoulder, constructed in the manner and for the purpose herein set forth; and in combination therewith I claim the recess in the runner on one side of the eye of the stone, as above described.

E. A. KNOWLTON.

No. 3909.

What I claim as my invention, and which I desire to secure by letters patent, is the construction of the two hinged gripers for holding the ends of the leather whilst straining it—that is to say, being made with openings in the lower ends of the gripers, beveled on the inside, or wider on the outer than on the inner face, into which are fitted loosely hinged shutters of corresponding size and shape, between which and the griper the end of the leather is griped, a projection or cog being formed on the lower end of each griper, that runs back and forth in the horizontal grooves in the plates in the head of the jaws; the upper ends of the gripers being hinged to the horizontal connecting bar containing the female screw, into which is screwed the vertical male screw, passing through the top of the sliding frame. I also claim constructing the jaws with the channeled plates, in the manner and for the purpose set forth.

COSMAN WHITE.

No. 3910.

What I claim as my invention, and desire to secure by letters patent, is the manner in which I have combined the oven and fire box—that is, the fire box being surrounded with an air chamber, perforated through the top plate with holes communicating with the oven, the oven being directly over the fire box, and the smoke pipe ascending through the oven, and the flame and smoke being distributed over the top of the oven in the manner described; these features, in combination, constituting the economy of my summer baker. The whole arrangement and combination being substantially as herein set forth.

JOHN T. DAVY.

No. 3911.

What I claim as my invention, and which I desire to secure by letters patent, is the arrangement of the horizontal parallel tubes and slides, and the manner of dividing the bees by means of the breath, as set forth.

ELIAS JONES.

No. 3912.

What I claim as my invention, and which I desire to secure by letters patent, is the combination of the revolving whipper with the endless conveyor, arranged and operated in the manner and for the purpose set forth.

FONES McCARTHY.

No. 3913.

Having thus fully described my plough, what I claim therein as my invention, and desire to secure by letters patent, is the combination of the stubble bit with the land side casting, in the manner and for the purpose herein set forth.

SETH J. ROBERTS.

No. 3914.

What I claim as my invention, and which I desire to secure by letters patent, is—

1st. The arrangement of the horizontal bars, crossed levers, and jaws, with the female screw formed therein, in combination with the catch to stop the hammer, and horizontal screw shaft, as described.

2d. The arrangement of the triangular wire rod and wire-hooked rods, passing through slots made in the hammer handle, in the manner and for the purpose described, in combination with the stock or frame upright piece of iron spiral or other springs, for holding the tool in the required position, as described.

3d. The mode of lessening the force of the blow of the hammer as the point of the file approaches the tool, by means of the forked bar, secured to the upright attached to one end of the frame, coming in contact with the transverse board secured to the end of the wedge, as the front of the file approaches the tool, and forcing said wedge forward, which causes the spiral spring to raise on the upright pin, as described.

4th. The mode of increasing the effect of the blow of the hammer, by pushing down the inclined slide, which acts on the end of the piece of timber and raises the upright, and causes the end of the hammer-handle, in its descent, to come in contact with the pin resting on the spiral spring, which depresses said spring; and when the handle is disengaged from the tappits on the wheel, the spring, pressing on the under side of the handle, forces it upward, and thus adds to the force of the blow of the hammer.

SOLOMON WHIPPLE.

No. 3915.

I do not claim the making what is termed a pantaloon button, in two pieces of metallic plate, held together by the edge of one being turned over upon that of the other, nor do I claim the combination of the two plates (so applied to each other) with a circular or other proper shaped piece of wood, or cloth, or woven material, interposed between them; neither do I claim the combination of a plate of metal and a circular disc of wood together—the former being confined to the latter by its edges being lapped over and pressed down upon those of the latter; but that which I do claim is my improvement in the modes usually adopted for forming or making the eylet-holes or thread-passages of buttons, composed of two circular plates of metal, the one of said pieces being confined to the other, as above described; the said improvement consisting in punching holes through the plates (so as to leave a burr projecting on one side of the plate from each hole) before they are applied and connected to each other, and (in combination with) applying the said holes of one plate to those of the other in such manner that

their burred projecting edges may be in direct contact, and the counter sunk portion of each of the holes of the plate (there being the same number of holes in each plate) be opposite to that of the corresponding hole of the other plate, thereby forming eylets or passages counter-sunk on *both sides* of the *button;* by which mode of constructing the above, the wear of the threads which secure the button when sewed to cloth or other material is to a very great degree obviated; the whole being substantially as above described.

JOHN HATCH.

No. 3916.

I claim as my invention, and desire to secure by letters patent, the manner in which I have constructed my shoulder-iron, by the combination of the two portions, essentially in the manner described—the distance of these two parts being regulated substantially in the manner set forth.

JAMES W. NEWBERY.

No. 3917.

Having thus fully described the nature of my improvements in the printing-press, what I claim as new therein, and desire to secure by letters patent, is the manner in which I combine, arrange, and operate the apparatus for governing the motion of the sheet on which the impression is to be made—said apparatus consisting of the sliding catch, the wheels, the cam, and the catch; these parts being arranged and operating substantially as described.

J. C. KNEELAND.

No. 3918.

What I claim as my invention, and desire to secure by letters patent, is the manner in which I have combined the coulter, the land-side, and the self-sharpening point, so that the three may be secured together by two bolts, giving, at the same time, great strength to these, as herein above described.

E. BALL.

No. 3919.

What I claim, and desire to secure by letters patent as my invention, is, 1st. The combination of a set of flues and dampers, as above described, between two horizontal plates, for the purpose of drawing the flame and heated air around and about the boilers or kettles, as herein set forth, by which I admit the flame and heated air through the lower horizontal plate into the flues above named, at one side or portion of the boiler apertures, thereby obliging the draught first to cross the bottoms of the boilers or kettles, and then through the apertures in the horizontal plate; thence around the boilers or kettles, through the flues, to the flues to the pipe.

2d. I claim the combination and arrangement of the cylinder for burning coal with the plates, in the manner and for the purpose above described.

ROBERT WILSON.

No. 3920.

What I claim as my invention, and desire to secure by letters patent, is the arrangement of the lever with which its click and ratchet-wheel, in combination with the pins or studs upon the cutter-gate, by which I regulate the length of the feed, and at the same time insure the operation of the pins upon the click; all of which being arranged, constructed, and operates as herein above described.

D. M. SECHLER.

No. 3921.

What I claim as my invention, and desire to secure by letters patent, is the application of the difference in the expansion of two metals, or the expansion of a metal, as a means of preventing explosions of steam-boilers, in the manner described, or any analogous means producing the same result or effect.

C. EVANS.

No. 3922.

Having thus fully described the nature of my improvement in the manner of applying the hot blast to the bloomery forge-fire, I do hereby declare that I do not make any claim to the applying of the hot blast thereto, nor do I make any claim to the form or combination of the pipes for heating the air—this being the same with numerous others which have been long known and used; but what I do claim as of my invention, and desire to secure by letters patent, is the manner in which I have combined said pipes with the bloomery forge-fire, by placing them within the chimney immediately over said fire; which chimney is formed in the manner herein described and represented, so as to effect the desired object without the use of an arch or of any analogous structure. To this particular combination and arrangement I limit my claim.

PAUL A. SABBATON.

No. 3923.

1. What I claim as my invention is the mode of liberating and reclosing the valves in combination with the expansion-tube and rod, (the rod being hermetically attached to the inner end of the tube,) by which arrangement a stuffing-box, for establishing the connexion between the inside and outside of the boiler, is dispensed with, as described.

2. What I also claim is, so connecting the safety-valves with the expansion-rods as to reclose the valve by the contraction of the metal after a given quantity of steam has blown off, as described.

WM. M. WRIGHT.

No. 3924.

What I claim as my invention, and which I desire to secure by letters patent, is the construction of the bed in which the grain is ground, and through which it is discharged when ground to the degree of fineness re-

quired; that is to say, constructing the centre with a longitudinal, semicircular, or other concave depression, in combination with the sides, flaring outward and upward, forming the inclined planes, which are perforated with apertures of the size to which the grain is to be reduced, and through which the grain is discharged when thus reduced; said inclined sides serving, also, the purpose of conductors of the grain to the bed, as guards to prevent its escape therefrom, in combination with the pounders, as herein described.

FONES McCARTHY.

No. 3925.

Having thus fully described my improved temple, what I claim therein as my invention, and desire to secure by letters patent, is having the movable jaw at one end, and the lever by which it is operated at the other end of the rod, and near to the joint which connects the bar to the beam, in combination with the long bar jointed to the breast-beam, so as to act when there is little or no motion; by which the operation is rendered more effective, and the free action of the temple unimpeded and more certain.

E. B. BIGELOW.

No. 3926.

Having thus described my invention and its operation, what I claim therein as new, and for which I desire letters patent, is extending the shaft of the presser down from the pressing arm to the bottom of the flyer, and providing the lower end thereof with an arm, which, in combination with the spring attached to the flyer, enables the attendant to throw back the presser, which is there retained till the spool is doffed and replaced by an empty one, as herein described.

E. B. BIGELOW.

No. 3927.

What I claim as my invention, is the combination of the grooved block which embraces the saw with the bar joined thereto in the middle, and the file-frame which slides vertically and horizontally on the bar; the said file-frame being provided with a spring to bear the file on the saw, as described in the foregoing specifications.

JACOB ARNDT.

No. 3928.

What I claim as my invention, and desire to secure by letters patent, is the mode of equalizing the tension of the cord or chain of the barrel, by the combination of the lever, link, and spring, whether constructed and arranged precisely in the manner described, or in any other mode substantially the same.

JOSEPH IVES.

No. 3929.

What I claim as my invention, and which I desire to secure by letters patent, is the mode or manner of casting pipe-boxes for carriage and other

wheels, by the use of the segment core, constructed and arranged and used in the way described, for chilling or hardening and finishing the interior surfaces of the boxes.

JOHN HUNTINGTON.

No. 3930.

Having thus fully described my improvement, what I claim therein as new, and desire to secure by letters patent, is the combination of the guide carriages or indicators on each side of the pulley, with the *screw and lever power-press*, to prevent the lateral motion, while it allows a free vertical action, all as above described.

P. G. GARDINER.

No. 3931.

What I claim as my invention, and desire to secure by letters patent, is the use of the small valves operating in the centre of the main valves, and by the same motions substantially as above described, by which arrangement much of the power required to open the valves in the old way is saved for the direct action of the engine.

SAMUEL TALBOTT.

No. 3932.

What I claim as my invention, and desire to secure by letters patent, is the combination of the inclined plane, rollers, and spring, in the manner above described, for any of the above mentioned, or for any other purpose to which the same may be applicable.

LEVI BISSELL.

No. 3933.

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the double acting suction and force pump, with one valve, constructed and operating substantially in the manner and for the purpose herein set forth.

JOSEPH H. WEBSTER.

No. 3934.

What I claim as new, and desire to secure by letters patent, is the combination of the spindle, the end of which is adapted to the reception of the strand for forming with the sliding block or guide, for winding on after the strand is formed, as described; also the combination of the spindle in the machine for laying the rope, the end of which is adapted for receiving the rope, while giving the after turn with the sliding block for winding on the rope after it is laid, as described.

This invention differs from Townsend & Durfee's reel, patented in 1830 or 1831, in the following particulars: In the use of that reel it was necessary, when a single length of the walk or building was spun in yarns, to lay the same into rope, and reel the same before spinning a second length.

In spinning a second length, the threads or yarns were united to the several threads or yarns already finished, by splicing or spinning into them, and so a second part of the rope was made and reeled as before.

By this process being repeated, the rope was made of the desired length, but could not be made *patent formed* without lacing or splicing in the strands of the threads or yarns.

This invention differs from the ordinary forming jacks in use, in the spindle to receive the portions of the strand when formed, and in the gearing to guide the strand when reeled upon the spindles. It also differs from the laying jacks in common use, in having spindles to carry the indefinite length of strand, which at the same time gives the fore-turn for laying, and a spindle to carry the indefinite length of rope as it is finished, at the same time giving the after-turn for laying.

The term *formed rope*, sometimes called *patent formed*, implies that the yarns or threads of the several strands receive their relative place and bearing in the strand by the following process: A certain number of threads or yarns are passed through the centre of a gauge-plate forming the centre of the strand, while all the other threads or yarns forming the entire strand are arranged in circles around the centre, each passing through the plate separately, and receiving its exact and similar place in the strand, which is retained by the strand so formed being passed through a close tube, and followed by twist from the forming jack. This is what is called forming rope, and by the machinery hitherto used ropes could not be formed to exceed the length of the building in which they were made. In making *laced rope* it was customary to form the strands the length of the walk, and, cutting them off, lay the part so formed into a rope. The part so finished was then reeled upon Townsend & Durfee's reel, and a new set of strands formed, which were joined to its corresponding strand on the reel by knotting the yarns two and two in each strand, and hauling them together by lacing a yarn through the bends of yarn.

This lacing occupied some six to eighteen inches, and the yarns, in twisting in this place, lost their bearings in the strand, as the outside yarns were drawn tight by winding round the centres, which became proportionably loose and made a weak spot.

The forming of full length strands could not have been done by any forming jack constructed on the principle involved in the reel of Townsend & Durfee hitherto patented, since, in the use of that reel, the rope or strand was passed through a hole or aperture in the forward bearing of the spindle, and could not have been reeled smoothly or without displacing the form of the strand. In the use of the new machinery, on the contrary, the most powerful stretch, both of the strand and rope, is maintained through every part of the process of the manufacture, which, adding greatly to the hardness and solidity of the rope, is altogether essential for railroad purposes.

The inventions in use in Europe by which twine and small cordage are made of great length in a square room, it is believed, would utterly fail when introduced for the manufacture of railroad rope, for reason of the immense power that is necessary in the manufacturing of a rope of such great length and size, often weighing twenty thousand pounds in a single length of hard and solid rope.

EDWARD S. TOWNSEND.

No. 3935.

What I claim as my invention, and which I desire to secure by letters patent, consists in the combination of the adjustable vibrating roller of inclined blades with the revolving cylinder of cutters, arranged and operated in the manner set forth.

GEORGE A. COFFMAN.

No. 3936.

Having thus fully described my invention, what I claim therein as new, and desire to secure by letters patent, is the combination of a shaft, having two or more series of cams thereon, with a common hemp break, such as is used by hand; said shaft having a lateral motion so as to bring either of said cams into action at will, the whole being constructed and arranged substantially as herein set forth.

P. G. GARDINER.

No. 3937.

Having thus fully described the manner in which I construct my improved machine for polishing flat plates or tables of marble, or other substances, I do hereby declare that I do not claim as new either of the individual parts of said machine, but limit my claim to the combination of said individual parts, as above made known; said parts consisting of the reciprocating polisher, combined with the crank wheels, with the driving wheel, and with the sliding head and regulating rods and levers, so as by said combination to constitute a machine substantially the same with that herein described.

JACOB ZEIGLER.

No. 3938.

Having thus fully described my machine for cutting and grinding corn and fodder, and other vegetable substances, and explained the operation of the same, what I claim as new therein, and desire to secure by letters patent, is the arrangement of the knives upon the wheel and the openings under the same, (for allowing the substances acted upon by the knives to pass through the same.) in connexion with the crushing or grinding surface of the opposite side of the said wheel, and the combination of the cutting and grinding wheel with the stationary wheel and the semicircle, as herein represented and described. The peculiarity of my machine consists in the cutting knives being placed upon one side of a wheel, and the grinding projections, or teeth, upon the other side of the same; the substances, as they are acted on by the knives, passing through the cutting and grinding wheel, (through the openings under the knives,) and being ground on the other side of the same, as herein described.

JACOB ROYER.

No. 3939.

Having thus fully described my improvement, what I claim therein as new, and desire to secure by letters patent, is the turning plate in combi-

nation with the grate of the fire chamber, for the purpose of conducting the ashes from the fire chamber above, under the grate.

JOHN T. DAVY.

No. 3940.

What I claim as my invention, and desire to secure by letters patent, is the fastening of the string to the shorter arm of an elbow-lever, or any other lever or levers the same in principle, the extremity of the longer arm of which being furnished with a perforation or slot through which a thumb or key-screw passes, the lower extremity of which passes again through a plate inserted in the tuning block, by which means the instrument may be tuned in a very simple, easy, and expeditious, but precise manner, by any professor or amateur of music, without the aid of any professional tuner; the whole of which improvement being constructed and operating substantially as herein above set forth.

LOUIS RUECKERT.

No. 3941.

The invention of this entire instrument I do not claim; but what I do claim as my invention, and desire to secure by letters patent, is the mode of adjusting and comprising the point for use, and releasing the same, when necessary, from the instrument; this is effected by constructing that part of the jaws extending from *c* 1, to *c* 2, in a tapering form; so that the jaw shall be at *c* 1 about two-thirds as thick as at *c* 2.

2d. By making the hole through the socket of the same degree of taper as the jaw, and of proper size to exactly embrace the jaw, when driven home to its place, as seen in figure 1.

3d. By making a channel on the one side of the jaws, next to the jaw, about one-tenth of an inch deep, about seven-eighths the length of the jaw, terminating the channel about one inch from the end.

4th. By making the point about one thirty-second part of an inch thicker than the depth of the channel in C C.

To adjust the point and secure it firmly in the instrument for use, I place the point in the channel made in C C, as seen in figure 3; then, holding the point in the channel, I slide the point and the jaw into the socket; then, holding the instrument by the handle, with the sharp end of the point upwards, I strike the end of the jaw upon some hard substance, as a small block of wood, which, by the force of the blow, causes the jaw to settle firmly into the socket, and produce a pressure against the point, which secures it firmly in its place. The instrument is then ready for use.

When I wish to release the point for sharpening, &c., I hold the instrument by the handle with the sharp end of the point upwards, and strike the end of the jaw upon the block of wood, which instantly displaces the jaw and releases the point.

JOHN C. DEXTER.

No. 3942.

I claim the above described manner in which I arrange the parts of my brick machine which form and compress the brick, and afterwards dis-

charge it from the mould ; that is to say, the arranging and operating them so that while one brick is being compressed in one compartment of the mould, by the compressing pistons, the discharge piston shall be performing its office of expelling from the mould the brick which had next previously been formed, the mould being progressively moved forward at regular intervals of time, so as to present that compartment of it in which the brick has been compressed to the action of the discharging piston, where the compressing pistons next enter the preceding apartment, to effect the formation of a brick therein.

JOHN WAIT.

No. 3943.

Having thus fully described the manner in which I construct my improved rotary hydraulic steam engine, and shown the operation thereof, what I claim therein as new, and desire to secure by letters patent, is the combination with each of the steam arms of a tube, one end of which shall dip into a reservoir like that marked *f*, which is to contain a portion of water or other fluid, which fluid, in its heated state, is to be carried into the steam tube by the centrifugal action of the engine, and is to enter said steam tube near the orifice for the emission of said steam; said water or other fluid being allowed to flow back into the reservoir, so that it may be continuously used for the purpose and in the manner herein set forth.

I do not claim the introducing of a jet of cold water into the revolving arms, for the purpose of condensing the steam, as was proposed in a rotary engine known as Saddler's, the water or other fluid used by me being, as heretofore stated, employed in its heated state, and for a purpose altogether different from that of condensation.

JAMES BLACK.

No. 3944.

Having thus fully described our machine, and its operation, what we claim therein as our invention, and desire to secure by letters patent, is the method, herein described, of tinning the inside of lead pipes in the course of manufacture, by passing the melted tin down into the mandrel and out at the side thereof, as above made known, whether applied to this machine or any other, substantially the same.

HENRY M. WARD,
SAMUEL L. SELDEN,
ELISHA Y. KNEELAND.

No. 3945.

Having thus set forth the nature and principles of my invention, that which I claim is as follows, viz:

I claim the spring bar or lever in combination with or as applied to the rest plate, and arranged and operating substantially as set forth, for the purpose of conveying or feeding the wire into the cutting dies, in the manner as described.

Also, the improvement by which the proper adjustment and holding of the rivet blank during the operation of forming the head thereon, and the

discharging of the rivet from the apparatus after its formation is effected; the said improvement consisting in arranging *within* the *movable* cutter the forcing mechanism, or movable piston, &c., connected with it: the whole operating and being arranged substantially as set forth.

HORATIO G. REED.

No. 3946.

Having thus fully described my improvements, what I claim as new, and desire to secure by letters patent, is the combination of a pipe or tube, constructed and arranged substantially in the manner set forth, with a stove or fire-chamber, as above described, for ventilating the room and supplying air at high temperature.

I also claim, in combination with the above, the radiator or column, the outer case surrounding the stove, and the eduction or hot air pipes; constructed and arranged in the manner and for the purposes herein specified.

JOHN MORRISON.

No. 3947.

Having thus fully described the nature of my improvement, and shown the manner of carrying the same into operation, what I desire to secure by letters patent is the use of the continuous strip of wood, or other elastic substance, combined with the under rails, as described herein, and the wrought or cast-iron top rails of the plate or bridge, or any other form, substantially in the manner set forth.

I also claim the manner of connecting and holding together the upper and under rails of iron, as herein described, so as to make the under rail serve as a *chair throughout its whole length*, to the top rail, the latter being imbedded in a channel in the former; or, as in the other described plan, when the top rail is grooved on the under side, and rests on the under rail as a saddle, thereby giving strength and stability to the joints of both the upper and under rails.

I claim the use of cast-iron top rails, when in connexion with iron under rails.

JOHN ELGAR.

No. 3948.

What I claim as my invention, and desire to secure by letters patent, is the combination of the weight and catch with the bobbin or spool, constructed and arranged in the manner and for the purpose substantially herein set forth, so that when the weight is drawn up it will relieve the catch, and allow the spool to unwind and the weight to fall.

E. B. BIGELOW.

No. 3949.

I do not claim to have invented an auger-bit or a handle, nor do I claim any of the parts employed herein, taken separately from the uses to which I have herein applied them; but I do claim as new and of my own invention, and desire to secure by letters patent, the application of the tapered tang, with two counter-sunk sides, forming diagonal lips, to overlie two

edges of a corresponding mortise in the centre cylinder, in combination with the sliding collar, driven on by either half handle, when screwed up, so as to place and hold the lips of the tang over the edges of the mortise, and thereby hold the auger-bit secure in the handle, at the same time facilitating the separation and exchange of the parts; the whole constructed and operating substantially as herein described.

D. C. STONE.

No. 3950.

What I claim as my invention, and desire to secure by letters patent, is constructing the cylinder of cutters with parallel bars and spirally arranged cutters, made adjustable with screws and nuts, in the manner and for the purpose described.

I also claim the arrangement of the smoother in combination with the rotating cutters.

I likewise claim the manner of adjusting the vice-nut, for throwing the carriage in and out of gear with the screw, by means of the slide and screw.

JAMES D. WILLOUGHBY.

No. 3951.

Having thus fully described the nature of my improvement in the machine for hulling cotton seed, I do hereby declare that I do not claim the double beater, or the rack, as being new in themselves; but what I do claim as new, and desire to secure by letters patent, is the combining of such a beater and rack with the cylinder, concave, and riddle, constituting the main operating parts of the above named machine for hulling cotton seed, by which combination said machine is essentially improved, and economy greatly saved.

JABEZ SMITH.

No. 3952.

What I claim in the above described instrument, and desire to secure by letters patent, is the combination of the spring with the oil can or syringe, substantially in the manner and for the purpose above described.

ELIPHALET S. SCRIPTURE.

No. 3953.

What I claim as my invention, and desire to secure by letters patent, is hanging the spindle, on which the horse-wheel turns, to journals or trunnions, to admit of canting the wheel for admitting the horses, &c., within the rim, as herein described, or in any other substantially similar.

I also claim applying the circular metallic rim as a propelling power, in combination with the two rollers, placed in axles, which are connected by two cogged wheels geared into each other, thus combining the adhesion which is required on both sides of the rim, as described.

JOHN HAW.

No. 3954.

I claim the arrangements of parts constituting the peculiar take-up motion, in combination with the machinery for arresting the progress of the loom when a filling thread breaks, as the same is represented in the drawings, and as above described, and as combined and operating substantially as set forth; I also claim the mode of operating the revolving shuttle box, (represented in the drawings,) or turning the same round at suitable intervals of time, for the purposes set forth, namely, by means of the vertical cogged wheel having pins extending from its sides in combination with the dogs of the notched circular plates, and with the pinion on the revolving shuttle box; the same being arranged and operated substantially as set forth.

I also claim the employment and use of circular notched plates in combination with the connected pawls or dogs, as above described, whether the same actuates the shuttle box by the mechanism which intervenes between the said plates, with their appendages and the said shuttle box, as herein before set forth, or by any other which may be adapted thereto; the whole being arranged and operating substantially as above specified.

JAMES NIELD.

No. 3955.

I claim the peculiar "take up motion," and machinery for arresting the progress of the loom when a filling thread breaks, as represented in the drawings; the same consisting of a series of looped strings or other similar contrivances fixed to the breast beam, and arranged in other respects as set forth, the moving or hinged frame, and other mechanism, intervening between the said frame and the usual hand lever and shaft of the ratchet wheel, or connecting the same together; that is to say, I claim the combination of the said mechanism for the object and purposes specified, the same being substantially as set forth.

JAMES NIELD.

No. 3956.

What I claim as my invention, and desire to secure by letters patent, is the method of making said paint by the composition of the substances mentioned, in the manner above mentioned; the same to be made of different degress of thickness, so as to be used either as a paint or a putty.

THOS. G. WARREN.

No. 3957.

We do not claim a wheel having a series of dicing tools alone applied to it, as heretofore made, or one having a series of polishing tools alone; but that which we do claim is the arranging of a series of dicers, and one of polishers, upon wheels, so as to be operated with respect to each other substantially as described; and furthermore, we do not claim the use of a tool for cutting or repairing the dicing tools; but that which we do claim, is the arranging and applying such a tool (or the tool in) upon the top of the curved table, in such manner as to admit of its being readily forced

forward against the dicers, at any time whenever necessary for the purpose of cutting them, as herein described.

RUFUS BRACKETT,
HENRY BRACKETT.

No. 3958.

I do not mean or intend to claim as my improvements or invention any of the parts of the machine or machines, presses, or letter copying machine, herein delineated or described, nor do I intend or mean to limit myself to the employment of any particular material or meterials in the construction thereof, but to use any which are fit and proper for the purpose intended. But I do hereby *claim* the use and application of a flexible or elastic platen in the manner herein described, the application of pressure thereto in printing presses, copying presses, lithographic presses, and zincographic presses, by means of a liquid aeriform fluid, in the manner also herein described, and the arrangement of the machinery or parts of the said presses, as herein described, for the purpose of applying such pressure of a liquid or aeriform fluid to such flexible or elastic platen.

JOS. SAXTON.

No. 3959.

What I claim as my invention, and desire to secure by letters patent, is the construction of the buckets above described, either longer or smaller than herein described, but not varying their relative size.

OBADIAH AYLSWORTH.

No. 3960.

What I claim is the employment of the apparatus termed the working column in combination with the uplifting valve and float, as herein described, whereby the pressure of steam on the working column is added to the pressure on the safety or uplifting valve, for the purpose of opening it when the water descends below a given point, and which, at the proper height of water, permits free action of the uplifting valve, as herein described; and I also claim the employment of a pendulum so situated, or so suspended, that by the rocking, tilting, or creening of the boiler or boat upon which such pendulum shall be employed, the said pendulum shall so attach itself to, or so suspend itself upon a tackle, lever, or pivot, as thereby to apply its weight as a moving power to the opening of a safety valve or valves for steam boilers, as herein described.

ABRAM PATERSON.

No. 3961.

Having thus fully described the nature of my planing machine, and shown the construction and operation of the respective parts thereof, what I claim therein as new, and desire to secure by letters patent, is the particular manner in which I form and arrange the parts concerned in fastening the cutters or irons in the planing wheel, under that form or modification of it which is last described in the foregoing specification; these parts con-

sisting of a strip of metal inserted in the arms, and of the screws, with their tapering points, arranged and operating as set forth, and also the analogous arrangement of the screws and wedge pieces for fastening the cutters of the tonguing, grooving, and jointing heads; the respective irons or cutters of these heads being formed, arranged, and combined in the manner above described.

BENJ. BICKNELL.

No. 3962.

What I claim as new, and desire to secure by letters patent, is—

1st. The above described cross beam, combined with the pedestals, the springs, the connecting bars, and the housings, substantially as described, by which a yielding capacity is given to the superstructure or frame part of the truck, without affecting the condition of the remaining wheels.

2d. The formation of the journal boxes, as described at figures 2 and 3, by which the axles of the truck may vibrate laterally, (the one independent of the other,) to accommodate their position upon the track, (and so making curves easy,) which, combined with the other yielding qualities of the truck, acting together, produce a semi-universal joint effect.

FOWLER M. RAY.

No. 3963.

What we claim as our invention, and desire to secure by letters patent, is the arranging of the upper and lower turning sashes of a window in *sliding frames*, substantially in the manner hereinbefore described, so that they may be turned on their centres, or axes, for the purposes stated, the space at the top of the boxing being formed to allow the frames, &c., to be pushed up, as hereinabove described, in order to effect the above-named turning of the sashes; the whole arrangement and operation being substantially as hereinbefore set forth.

C. J. SCHIRER,
THAD'S W. CROSS.

No. 3964.

What I claim as my invention, and which I desire to secure by letters patent, is the combination of the horizontal sliding forked stuffer and tube, and clamp, with the hopper, constructed and arranged in the manner and for the purpose set forth, or other mode substantially the same, by which analogous results are produced.

THOS. WILES.

No. 3965.

What we claim as our invention, and desire to secure by letters patent, is the combination of the materials, in the general proportions above described, for making an adhesive plaster.

We also claim making plasters *porous*, or *pervious* to fluids, by perforating them with numerous minute holes.

WILLIAM H. SHECUT,
HORACE H. DAY.

No. 3966.

Having thus fully described the nature of my improvement in the drip-cup of the the solar lamp, what I claim as new therein, and desire to secure by letters patent, is the combining with the draught holes of such a cup a rotating or other valve or air regulator, which is capable of being nearly, but not entirely closed—such as is herein described, and substantially in the manner and for the purpose above set forth.

I do not claim such a valve, or regulator of the draught, as new in itself, but limit my claim to the combination thereof with a drip cup of a solar lamp.

E. WHELAN.

No. 3967.

What I claim as my invention, and desire to secure by letters patent, is the application of an oval wheel, flat or convex, to operate as described in the foregoing specification.

I do not claim any part of the machinery used in the construction thereof.

GERRETT ERKSON.

No. 3968.

Having thus fully described the nature of my improvements in the manner of arranging and combining the apparatus concerned in the arresting of the momentum, and in the throwing of the shuttle, what I claim therein as new, and desire to secure by letters patent, is the employment of the spring on the inside of the projecting guard, in the manner and for the purpose described. I also claim the particular manner of combining the treadles, the wag staves, and the picker staves, with each other, as herein described and represented, so that they shall co-operate in producing the required motion, as set forth.

I do not claim as new the manner of forming the picker staves, with a rocker on their lower ends; nor do I claim the using them without the ordinary picker, this having been previously done, but limit my claim to the arrangement and combination above named.

DANIEL BARNUM.

No. 3969.

What I claim as my invention, and desire to secure by letters patent, is the application of air, through metallic pipes or tubes, to mill-stones, as herein described, to prevent millstones from heating, and also facilitate grinding.

FERRIS FRELIGH.

No. 3970.

What I claim as my invention, and desire to secure by letters patent, is the manner in which I construct the tongue of my buckle, substantially as herein described, the tongue being combined with a spring, and so operated on the same that it enters the holes in the straps in the direction and manner substantially as set forth.

KASSON FRAZER.

No. 3971.

What I claim as my invention, and which I desire to secure by letters patent, is the mode herein described of warming the bees in the hive—the hot-air tube, in the lower part of the hive, arranged with reference to the entrance as described; its upper part provided with a drum, surrounded with wire gauze; the whole arrangements of parts of the said heating apparatus, and purpose of the same, being as herein described.

SILAS HART.

No. 3972.

What I claim as original is the combination of the moth trap or harbor, before described, with the suspended hive, constructed and arranged in the manner set forth.

A. SANBURN.

No. 3973.

What I claim as my invention, and desire to secure by letters patent, is the construction and arrangement of the bars for the purpose of saving all the gravy, as herein set forth, whether constructed in the precise manner above described, or in other mode substantially the same, by which analogous results are produced.

JOSEPH HAWKINS.

No. 3974.

What I claim as my invention, and desire to secure by letters patent, is, constructing boats of sheet metal, pressed into form in moulds, with beds, flanches, and mouldings, as herein described, for the purpose of taking up the surplus metal in forming the boat, to prevent wrinkles in the sides thereof, and for stiffening it, as above set forth.

I further claim the recess, moulding, and flanch, to receive the gunwale, which takes up the surplus metal along the upper edge of the boat, and gives sufficient strength and stiffness without frames or timbers inside; constructed substantially in the manner and for the purposes above specified.

JOSEPH FRANCIS.

No. 3975.

Having thus fully described my improvements and their design, what I claim as my invention, and desire to secure by letters patent, is constructing the stove in the manner described, with the sides and end plates splayed out at the joints or the corners in combination with the corrugated sides, substantially in the manner and for the purpose above specified.

ANSON ATWOOD.

No. 3976.

Having thus fully described the nature of my improvements in the cooking-stove, and shown the structure and operation of the respective parts

thereof, what I claim therein as new, and desire to secure by letters patent, is, first, the manner of combining the jamb flues with the upper part of the boiler space, and with the closed ash-pit, for the purpose of feeding the fire, and of carrying off the effluvia from said boiler space.

I also claim the combining with the foregoing the descending flue, furnished with a valve, the said flue space and its valve serving also to carry off the effluvia, and to regulate the draught down the jamb flues, said flues being arranged and connected with the other parts of the stove, as set forth.

GOULD THORP.

No. 3977.

What I claim as my invention, and desire to secure by letters patent, is the mode of arranging rollers 1, 2, and 3, for the purpose of regulating the delivery of the yarn, the arrangement being such, by placing one of the rollers between and above the other two, and carrying the yarn under roller No. 3, then over No. 2, and then under No. 1, and from thence to the heddles, so that the tension of the yarn draws the upper one upon the other two, to increase the bite on the yarn, and thus prevent slipping, all as herein described.

BENJAMIN SLINGERLAND.

No. 3978.

What I claim as my invention, and which I desire to secure by letters patent, is the before described mode of scraping the bottoms of rivers by operating a floating scoop by power machinery placed in a separate vessel, anchored on the opposite side of the river, said floating scoop being attached to an anchor up stream, so that the current will carry back the scoop to the opposite side of the river at the termination of every operation of the said scoop, for a repetition of the action of the scoop, the vessel containing the engine being moved up or down stream, as the work progresses, by the power of the engine, as described.

HENRY McCARTY.

No. 3979.

Having thus fully described my improvement, I wish it to be understood that I do not claim constructing wheels with the spokes standing bracing, by projecting inner ends out from the plane of the wheel on each side, nor do I claim screwing the ends up firmly against a centre, permanent projection on the hub, as that would not effect the object I have in view, which is to continually tighten the spokes and brace them out against the felloes as they wear loose; and what I do claim as my invention, which I desire to secure by letters patent, is the combination of the pipe-box with the cheek pieces, into which the spokes are inserted, and fastened by two plates on their outside—a space between said cheeks being left, so that they can be forced towards each other to tighten the spokes as they wear loose or shrink, and by that means firmly brace the wheel, which can be readily taken to pieces, and any broken or defective parts replaced by perfect ones.

ELIPHALET S. SCRIPTURE.

No. 3980.

What I claim as my invention, and desire to secure by letters patent, is the combination of the die with the rotating stock for the purpose and in the manner described. I also claim composing the die of the flat face, the groove, and the cutter, as described, so as to perform with the same instrument the three operations of hammering, rounding, and cutting.

NATHAN BRAND.

No. 3981.

I claim the making the boxes to slide vertically in the connecting-rod in combination with extending or lengthening the crank pins of the wheels beyond the said boxes, so as to slide through them in the direction of their axes, as set forth—the whole being for the purpose of converting all of several wheels of the engine into drivers.

HOLMES HINKLEY.

No. 3982.

Having thus fully described the manner in which I construct my double-acting turpentine shave, and pointed out the operation thereof, what I claim therein as new, and desire to secure by letters patent, is the connecting of the two gouge-formed shaves or cutters with their levers, by means of the double springs, in combination with the concave guide band; by which combination the shaves or cutters are moved in a curve the reverse of that described by the ends of the levers from which they derive their motion; and I do hereby declare that I do not intend by this claim to limit myself to the precise form in which the instrument is herein represented and described, but to vary the same as I may find expedient, whilst I attain the same end by means substantially the same.

G. R. TALLY.

No. 3983.

I do not claim setting the head and tail block by means of a rack pawl and level; but what I do claim is the before described combination of the railway and wheel with the sliding bar, hand, and lever, arranged and operated in the manner and for the purpose above set forth.

I also claim the setting of the reversible cogged bar, by means of which it can be adjusted to the hand when reversed or shifted for cutting different thicknesses of boards in the same log, and thus avoid the necessity of spoiling the first board cut after shifting or turning the cogged bar described.

BENJAMIN WEBB.

No. 3984.

I do not claim to be the inventor of hollow skeins for axletrees, for these have been heretofore used and secured permanently to the axletrees; but what I do claim as my invention, and which I desire to secure by letters patent, is the before described manner of fastening the skeins to the axletree, so that they can be tightened and turned, and changed in position,

whenever they become loose or uneven from the shrinking of the wood and the rubbing of the metallic surfaces, or from any other cause, by means of the aforesaid construction of the axletree and skeins, and arrangement of the screw-rods and nuts, used and operated in the manner set forth.

JAMES JONES.

No. 3985.

Having thus fully described the manner in which I construct my improved printing press, and shown the operation of the respective parts thereof, what I claim therein as new, and desire to secure by letters patent, is, first, the manner in which I have constructed, combined, and arranged the friskets, and the parts by which they are made to traverse through the machine, as set forth.

I do not claim the using of four friskets as in itself new, but I claim the manner and combination in which I use them, which are essentially different from any heretofore adopted; and these I claim, whether the form or forms of type be placed vertically or horizontally, and whether two impressions or one only be taken at the same time.

I also claim the manner of combining and arranging the parts by which the power is applied to the platens, through the intermedium of the revolving shaft, which is made to operate intermittingly, and to carry arms that bear upon the backs of the platens, as herein set forth.

JOEL G. NORTHRUP.

No. 3986.

And I declare my invention, under the present letters patent, to consist in the application to the lower end of the wooden pile, or a metal pin or shaft, of a broad metal screw or worm, for the purpose of enabling such a pile or pin to be inserted into or extracted from the ground, by causing it to turn upon its axis by means of cross levers, when it is placed with its point directed upon penetrable ground; and I claim, under the privileges of before mentioned letters patent, piles, pins, or shafts, so armed with broad metal worms or screws, whether the same be employed for piling ground for the support of buildings or embankments, or to obtain a secure hold of the ground for the purposes of mooring or holding fast ships and other floating or stationary bodies.

ALEXANDER MITCHELL.

No. 3987.

What I claim as my invention, and desire to secure by letters patent, is—

1st. The combination of the tension or yarn roller with the letting off motion, so that when the yarn roller is drawn forward by the process of weaving, the let off is put in motion, which relieves the yarn roller and allows it to fall back, and thus stop the let-off; and I also claim, in combination with the above, the break for preventing the yarn roller from moving while beating up the cloth.

2d. In combination with the measuring rollers, I claim the under wheel (2) and hand for measuring the cloth, as described.

3d. I claim the combination of the shuttle-boxes with the weight or

spring, by means of the chain and pulleys, and pin-wheel, with which the weight is made to connect, to change the pattern, while the machinery is guarded against injury if the shuttle should not be sent home.

4th. I claim, in combination with the pickers, the spring lever, arranged and operated as above described, so as to arrest the shuttle as it enters the box, and then to fall back to clear the point of the shuttle before the box changes.

Lastly, I claim the combination of the apparatus for stopping the loom; that is to say, the combination of the fingered lever with the levers (2,) and in the manner described, and, in combination with the above, the protector and stop on the wheel (2,) to arrest the motion of the crank shaft and throw off the shipper.

E. B. BIGELOW.

No. 3988.

I am aware that bevel wheels have been made dishing or concave, for the purpose of permitting other wheels to turn within their peripheries; and I am aware that a combination of wheels has been made in which the shaft of the last wheel passes through the shaft of the main or master wheel, and therefore I do not claim these as of my invention; but what I do claim, and desire to secure by letters patent, is the arrangement of the bevel cog wheels, with the shaft of the last wheel passing through the shaft of the main wheel in combination with the dished form of the main or master wheel, by which arrangement, in combining, the whole is rendered more compact than by any other with which I am acquainted; all as herein described.

RICHARD MONTGOMERY.

No. 3989.

What I claim as my invention, and desire to secure by letters patent, is running the self balanced gate on rollers, or pins attached to the posts and between the rails of the gate, by means of which the counterpoise employed in railway draw-bridges, as also a rail below or above in the passage of the gate, as in sliding-doors, are dispensed with, whether this be applied with the rails of the gate horizontal or inclined, to cause the weight of the gate to close it, as described.

ARNON BAKER.

No. 3990.

Having, therefore, described my improvement, I shall claim the revolving block and bit plate, as applied to each other and to the bolt, and operating upon the bolt through a spring lever or other suitable contrivance connected to the bolt, the whole being substantially as herein set forth.

JOHN OXNARD.

No. 3991.

I claim, first, employing instruments attached to a straight plate, and moving over a space equal to their distance apart, so as only to be in action a

small portion of time before they are relieved, substantially as herein set forth, the cutters each projecting over the one below it the depth of the cut to be made, as above fully made known.

Secondly, the method of moving the cutters from the stone, after every cut, as herein described, by means of the revolving of the vertical shafts, or any other means substantially the same, for the purposes herein described.

DANIEL PFISTER.

No. 3992.

Having thus fully described the nature of my improvements in the portable vapor bath, and shown the manner of using and the operation of the same, what I claim as new therein, and desire to secure by letters patent, is the combining of the hollow piston with the reservoir, which piston is made to regulate the elasticity of the vapor, in the manner and for the purposes herein set forth; said hollow piston also constituting a receptacle for such articles as it may be desired to convert into vapor by the heating of the fluid in the reservoir.

I also claim the particular manner in which I arrange and combine the respective parts of the burner or burners of my lamp; said parts consisting principally of the wire loop for sustaining the wick in a position nearly horizontal, and the sliding cover for regulating the flame—the whole operating substantially as set forth.

T. S. LAMBERT.

No. 3993.

What I claim as my invention, and desire to secure by letters patent, is the preparation of the hides or skins to be tanned, by puncturing or perforating them, either on the flesh or grain side, with holes extending either entirely or partly through, so as to admit the tannin more freely, and perfectly to penetrate and operate upon the skin or hide.

SIMON SNYDER.

No. 3994.

Having thus fully described the manner in which I consruct and arrange my apparatus for drying bagasse, what I claim therein as new, and desire to secure by letters patent, is combining with a steam engine, or other furnace used in manufacturing sugar, a horizontal range of triple flues, in such manner as that an endless apron or bagasse carrier may be made to traverse through two of said flues, whilst the heated air and gaseous products of combustion are made to pass through the third or middle flue, on its way to the chimney; the respective parts being arranged and operating substantially in the manner and for the purpose herein fully set forth.

GEORGE MERRICK.

No. 3995.

Having thus fully described my improvements, what I claim as my invention, and desire to secure by letters patent, is the combination of the lamp, or other light, and tubes, substantially in the manner and for the purposes above described.

I also claim the telescope herein made known, having glass at its lower end and a mirror therein, and side pipes attached thereto, the whole being combined and arranged as herein before made known.

SARAH P. MATHER.

No. 3996.

What I claim as my invention, and desire to secure by letters patent, is the combination of the boiler with the steam and hot-air pipes, and having the communications between them regulated by valve, the whole being constructed and operating as above described.

I do not, however, intend to be understood as confining myself to the use of any particular metal in the construction of my said apparatus, nor to the precise dimensions of the several parts thereof, as above mentioned. These may be changed, according as circumstances may require.

JOEL H. ROSS.

No. 3997.

Having thus fully described my improvement in presses, what I claim therein as new is the combination of the series of toggle joints with the beam, in the manner described, so that they can have a lateral motion without straining the beam.

J. SLOCUM.

No. 3998.

Having, therefore, explained my improved pistol, I shall claim extending the rear end of the dog, or catch, rearwards, and beyond, when it is jointed to the tumbler of the percussion hammer, and connecting the upper end of the main spring to the dog, so as to cause it to operate upon the hammer, dog, and trigger, substantially as described, the same being for the purpose herein before specified.

Also, the combination of the fixed angular stud with the dog or catch, jointed to the tumbler, for the purpose of enabling a person to cock the percussion hammer, in the manner as above set forth.

Also, my new and peculiar arrangement of the pitman upon the seer of the trigger, (so as to operate as above described,) in combination with the construction and arrangement of the teeth upon the breech or rear end of the cylinder or series of barrels, by which improvement in constructing and arranging the aforesaid parts I am enabled to very much simplify them, in comparison with the manner in which they have heretofore been made and disposed.

ETHAN ALLEN.

No. 3999.

What I claim for my invention, and desire to secure by letters patent, is the substitution of red sandstone and clay, reduced to a powder in the natural state, or argil, silex, and the oxide of iron, for the stone or sessyl, or val de travers, or other assimilated materials, in combination with the mineral tar or sessyl, or with any other bitumens used in the formation of mastics, or in the use of red sandstone alone with the mineral tar, or other bitumens.

WILLIAM H. CHASE.

No. 4000.

Having thus fully described my improvement, what I claim as my invention, and desire to secure by letters patent, is the combining the catch bolt and bolt of the lock, so that one will slide within a groove in the other, in the manner and for the purpose herein set forth.

RHODOLPHUS KINGSLEY.

No. 4001.

What I claim, and desire to secure by letters patent, is the construction and use of wheels with two spokes in one mortise, in the manner and for the purpose above described.

G. L. ACKERMAN.

No. 4002.

What I claim as my invention in this machine, and desire to secure by letters patent, is the manner of using the dashers, or piston that is attached to the stem of the steam valve, in combination with, and working within, a short cylindrical vessel, or check chamber, which is open at top to allow a free passage to the steam in and out, and is furnished with an adjusting slide to regulate the escape of the steam; by which means the valve is made to take its seat without striking or noise.

JOHN COCHRANE.

No. 4003.

Having thus fully described the nature of my improvements in the auxiliary engine, what I claim therein as new, and desire to secure by letters patent, is, first, the manner herein described of completing the stroke, or traversing motion of the valve, by the commencing return stroke of the piston operating on the spring arms, substantially in the manner and for the purpose herein set forth.

I likewise claim the manner of regulating the stroke of the water-pump, by adjusting the same by means of a valve or cock, as set forth, so that a smaller and regulated quantity of steam shall be admitted to the lifting than is admitted to the forcing side of the piston, as described.

JOHN COCHRANE.

No. 4004.

I do not claim the combining with the posts, braces, and strings of a truss a series of supplementary braces, &c.; but what I do claim is the arrangement of such a series of braces upon the *outer sides of the truss*, and so that they shall extend above and below the cords thereof, and be confined to the truss, substantially as above set forth.

GEORGE W. THAYER.

No. 4005.

I claim as my invention the method of rendering India rubber fabrics solid and substantial, for the uses and purposes mentioned, by impregnating

and combining the gum with grit, iron or other metal filings, or other hard substances, in the manner specified; and therefore I solicit letters patent.

NELSON GOODYEAR.

No. 4006.

Having thus fully described my application of the self-adjusting platen, and shown its operation, what I claim therein as new, and desire to secure by letters patent, is the application of the hydraulic cylinder to the platen, of toggle-joint, and other progress in power-presses—whether it be by applying the cylinder direct to the platen, or through the medium of screws or wedges, racks and pinions, or other analogous devices, so that, through the medium of the spring and gearing attached to the press, an increasing weight is thrown upon the valve so as to produce the desired effect upon the platen; the whole being combined and operating in the manner herein set forth.

JOSEPH C. COLT.

No. 4007.

Having thus fully described our process, we wish it to be understood that we do not claim extracting the tannin from the coloring-matter in quercitron bark, as that has before been done by the introduction of gelatine, by which it is separated; but what we do claim as our invention, and desire to secure by letters patent, is the process of separating the yellow coloring-matter and tannin, or astringent matter of quercitron bark, substantially as herein described; that is to say, by partially evaporating the decoction, and then allowing the coloring-matter to settle, and then drawing off the astringent liquid and preparing it for the uses intended.

GEO. W. CLOSE.
EDW'D FIELD.

No. 4008.

I do not claim the particular form or description of apparatus, still, or retorts, as set forth in the drawings (Nos. 1 and 2) herewith. What I claim, is the progress or mode of producing the American oil, as set forth in the above specification and drawings.

Such apparatus may be modified or varied, as circumstances may require from time to time, when deemed expedient.

What I claim is the process, as herein above set forth, of producing the substance which I denominate the American oil; such process being conducted substantially in the manner described.

W. T. CLOUGH.

No. 4009.

Having thus concluded my description, I shall claim the employment and use of the longitudinal centre rail-pieces and traverse rest-bars, as combined with or applied to the rectangular carriage, and for the purposes as above described.

JAMES DANE.

No. 4010.

Having thus described my invention, I shall claim a feeder constructed, substantially as described, of one or more troughs or apartments, and with discharging orifices and adjustable valves adapted to them; the whole being for the purpose as herein set forth.

ALEXANDER BOYD.

No. 4011.

Having thus fully described the nature of my improvements, and shown the manner in which I have combined them with the lock for safes, vaults, &c., invented by William Hall, and which may also be combined with locks of other constructions, what I claim therein as new, and desire to secure by letters patent, is the manner in which I have combined the revolving scutcheon, the steel plate, and the cam, with each other, and with the tumbler; under which arrangement the tumbler is left free to rise by the action of the revolving scutcheon, and is raised by a pin or projecting piece on the bit of the key; the whole combination and arrangement being substantially the same with those herein set forth.

I also claim the combining of the pipe or tube with a revolving scutcheon, in such manner as, by means of a slot in said tube, to admit a key having the ordinary bit or bits, that are to act upon the tumblers and bolt, as usual, and under the arrangement herein made known.

H. G. JONES.

No. 4012.

What I claim as constituting my invention in the above-described process, and desire to secure by letters patent, is the preparing of designs in relief, in copper or other suitable metal, for the purpose of printing typographically, or for other purposes, to which such designs are applicable, in the manner herein set forth of effecting the same; that is to say, by coating a block or plate of any suitable substance with a ground through which the lines of such design may be cut or traced as set forth, and giving the same a coating of conducting substance, so that a plate in relief may be obtained therefrom by the electrotype process, as described.

A. W. THOMPSON.

No. 4013.

We shall therefore claim the combination with the series of cutters, of the passages, &c., leading from the cutters and passages; the whole being for the purpose of making match-splints from a block or blocks, as described. Also the combination with the aforesaid cutters and passages of one or more dipping-frames, arranged and operating, with respect to them, substantially as herein before described. Also our improved manner of making the dipping-frames, viz: in sections of separate pieces or plates, as described. Also the combination of mechanism, by which each of the blocks of wood is held down upon the carriage and progressively forced forward against the board; the said mechanism being applied to the carriage and board, and constructed and operating together, substantially as hereinbefore set forth.

Also the combination of machinery, by which the dipping-frames are progressively moved forward; the said machinery being connected with and intervening between the carriage and the said dipping-frames, and operating substantially in the manner as hereinbefore explained.

ASA FESSENDEN,
LUKE L. KNIGHT.

No. 4014.

Having thus fully described my machine and its operation, what I claim as my invention, and desire to secure by letters patent, is the apparatus for skimming a liquid, by means of a vessel in which the scum is collected by the revolution of the flanch or sweep, forming a kind of spoon, acting down below, but very near the level of the scum, as set forth.

C. HARIVEL.

No. 4015.

What I claim as my invention, and desire to secure by letters patent, is—

Firstly. The manner of combining the heddles and lay, substantially as herein described, by means of the vibrating frame and lifters, *b* or *a*, and endless series of plates, constructed and arranged as herein set forth, instead of the usual way, by means of cams, treadles, &c.; thus simplifying the operation, and consequently producing a saving of expenses.

Secondly. Constructing the double hooks on the lifters, in the manner described, by gradually increasing the distance between the upper and lower hooks of each one of the series of lifters from back to front, so that the back harness shall be raised higher than the front one in proportion to its distance from the cloth.

WM. TOWNSHEND.

No. 4016.

Having thus fully described the nature of my improvement in building vessels, and shown the manner in which the same is carried into operation, what I claim therein as new, and desire to secure by letters patent, is the manner of attaching a movable to a stationary keel, and of shipping and unshipping the same by means of bolts and chains, substantially as herein set forth.

THOMAS F. GRIFFITH.

No. 4017.

Having thus fully described my improved planing machine, what I claim therein as new, and desire to secure by letters patent, is—

1st. The combination of the veneer saw with the planing wheel, for the purpose of reducing the plank or board to a uniform thickness; and,

2d. I also claim the combination of the veneer saw for reducing the plank or board to a uniform thickness with the tonguing and grooving wheels, as herein described.

3d. I also claim the manner of forming the tongue by the two tonguing-wheels, having pointed cutter irons with two cutting edges; the one cutting

the side of the tongue, the other the shoulder of the same: the shafts of the said wheels standing at an angle of forty-five degrees, more or less, and crossing each other at or about right-angles.

4th. I also claim, in combination with the tonguing-wheels, the separate wheel for rounding the tongue.

5th. I also claim the use of one of the tonguing-wheels (the other being removed) for cutting a rebate upon the edge of the plank, where they are intended for overlapping each other, as in weather-boarding.

6th. I also claim, in combination with the planing, tonguing, and grooving-wheels, the wheel for forming a bead upon the edge of the board.

7th. I also claim the stationary knives for cutting off the stub-shot from the end of the plank, in combination with the feed-rollers.

RIED R. THROCKMORTON.

No. 4018.

What I claim as my invention, and desire to secure by letters patent, is the connexion of the roost, whether of chickens or other fowls, with the bee-hive or palace; the use of the roost as a lever or instrument by which the passage or passages of the bees (into and out of the hives) are shut at night and opened in the morning, or any other manner of using the roost of fowls, whether the roost is a pole, a rope, or any other thing.

GEORGE UPHAM.

No. 4019.

Having thus set forth our invention, we shall claim one or more supplementary strings, damper, and bridge, (or other analogous contrivance for supporting the strings, and checking their vibration, as above set forth,) in combination with the string or strings, and hammer beneath the same, the supplementary string being arranged, tuned, and operating, with respect to the strings of a note, and struck by the same hammer substantially in the manner above specified. We also claim the making the pad of the hammer-head of different degrees of elasticity, or harder in the part of it directly beneath, and which acts upon the supplementary string, than it is in the part or parts beneath, and which strike the other strings, the same being for the purpose above explained.

CHARLES F. OLIVER,
GEORGE W. JACKSON.

No. 4020.

Having thus described my invention, I shall claim my improvement in dredging machinery; the same consisting in the arrangement of the mast directly upon, and so as to be supported by, the movable crane, in such manner as to be moved by and with the crane whenever the latter is turned horizontally towards the right or left, instead of making the [mast] said a fixture to the deck of the vessel or dredge, as heretofore.

I claim the above described peculiar arrangement, with respect to each other, of the capstan and crane, and, in combination therewith, that of the chain which elevates the excavating bucket, the latter differing from other arrangements thereof in being carried through the rear or after end of the crane, in the manner and for the purpose as herein before specified.

OLIVER ALLEN.

No. 4021.

Having thus fully described my manner of forming hat bodies, what I claim as my invention, and desire to secure by letters patent, is the manner of constructing hat bodies entire—brim, body, and crown—of two pieces of cloth or other material, cut out in the form and united in the manner herein described and represented, for the purpose of making a stronger hat than is made in the usual manner of forming the crown, brim, and body of a hat of separate pieces, and likewise for economising labor and material.

ISAAC L. CHAPMAN.

No. 4022.

Having thus fully described the construction and operation of our improved combined scutching and hackling machine for hemp or flax, what we claim as new therein, and desire to secure by letters patent, is the form and arrangement of the rest and the standards, as herein described and set forth. We also claim the rack, in combination with the improved combined scutcher and hackle, for separating the tow from the shives and dirt, as herein described. We also claim the drums at each end of the combined revolving scutcher and hackle, in combination with the rings for preventing the hemp or flax from being drawn in at the ends, and around the journals or shaft of the same, as herein described.

We are aware that machines for beating, scutching, and cleaning hemp and flax have been made with rows of teeth on a cylinder, and therefore we wish it to be understood that we do not claim this as our invention; but what we do claim and desire to secure by letters patent, is the placing of the teeth, which are in rows parallel with the shaft, in the direction of a helix diverging from the middle of the length of the cylinder towards each end, for the purpose of spreading and acting upon every part of a bunch of hemp, as herein described.

GEO. W. BILLINGS,
JOHN HARRISON.

No. 4023.

What I claim as my invention, in the above-described machine, is arranging the metallic rings, composing the burring cylinder, so near together that no burs, or seeds, &c., can fall in between them; the rings having hooked teeth cut in the periphery, as described, and so placed around the cylinder as not to have the teeth on any two adjoining rings to come opposite each other, by which the wool or cotton is drawn in below the surface of the rings, and the seeds or burs are cleaned off.

Secondly, I claim the combination of the burring cylinder, constructed as above described, with the feeding cylinders and trash cylinder, to separate the fibres of cotton or wool from foreign or useless substances.

STEPHEN R. PARKHURST.

No. 4024.

Having thus fully described the nature of my improved machine for cutting up and crushing the ears of corn, and shown the manner in which the same operates, what I claim therein as new, and desire to secure by letters patent, is the combination of the drum and cutter, the cutter on the

case, and the regulating concave, so as to co-operate in producing the desired effect in the manner set forth.

I likewise claim the combination of the drum and cutter F, and the cutter G, on the case, arranged as above set forth, when used without the adjustable convave.

HIRAM A. PITTS.

No. 4025.

Having thus described my several improvements in the construction of the ordinary cylinder printing press, and shown the manner in which the parts thereof operate, what I claim as new therein, and desire to secure by letters patent, is, first, the manner in which I have combined the flying sheet frisket with the cylinder printing press, as set forth.

I do not claim the frisket as being new in itself, it having been applied to the bed and platen press, but never, as I verily believe, so modified as to adapt it to the cylinder press. I claim, therefore, the manner described of pressing the ends of the slats between the adjustable tape rollers, by which they are enabled to conduct the sheet on to the frisket in the position which it must assume in the cylinder press, said frisket being governed in its motion by the cam, arranged and operating substantially as herein made known.

I claim the lifting of the cylinder when it is desired that it should bear on the form as it revolves, such lifting being effected by means of the apparatus connected with the lever, arranged and operating substantially as described.

I claim the manner herein made known of constructing the spring box or apparatus used by me for checking the momentum of the bed in a cylinder press, but which may be advantageously applied in other machines for the like purpose; said spring box or apparatus being furnished with a céntre shaft, carrying a toothed wheel that gears into wheels or pinions on several surrounding shafts, the whole of which shafts carrying spiral springs, arranged and combined as herein made known, so as to co-operate with each other in the manner described.

RICH'D M. HOE.

No. 4026.

Having thus fully described the construction and operation of my improved double action ball pump, I would observe that I do not claim the pump-action, nor the working of two pumps together by one piston rod; but what I do claim as new, and desire to secure by letters patent, is the working of two pumps upon one rod, within one cylinder, in the manner set forth; the cross-piece attached to the piston rod, and passing out through the slats, in the cylinder, in the manner and for the purpose herein described.

FRIEDERICH WALTHER.

No. 4027.

Having thus described our invention, we shall claim the combination of the gauge punch, with a hopper arranged beneath it, and having a guide tube, or other suitable contrivance of like character, adapted to it, the whole being arranged and operated substantially as above described; also the

manner in which the bristles are fed beneath the gauge punch, as fast as it is necessary, when others are removed by the same from the hopper, viz: by means of the weighted strings, adapted to the hopper and frame of the machine, as above specified.

We also claim, in combination with the weighted strings, elevating the hopper when the gauge punch rises upwards; the same being for the purpose of drawing the strings over the bristles, and thereby insuring their movement beneath and into the fork of the gauge punch.

SAMUEL TAYLOR,
ALBERT R. DAVIS.

No. 4028.

What I claim is the combination, herein described, of the three levers L, M, and N, having a common centre in the lever, with the rod and the slides, and as a means of adjusting the slides while the engine is in motion, and the lever is working the slides by a reciprocating motion, or any combination substantially the same; but I do not claim the combination of, or the right to use the combination of adjustable slides and fixed seats, with openings for each end of the cylinder, as herein referred to, and set forth in letters patent granted to Horatio Allen, in August, 1841.

THOMAS ROGERS.

No. 4029.

What I claim as my invention, and desire to secure by letters patent, is the combination of the broad, high, cylindrical wheels, turning on separate axles, spreading out the surface or bearing so as to prevent sinking into the ground, with a locomotive steam engine or other driving power located on the carriage, as herein described.

JAMES SEMPLE.

No. 4030.

What I claim as my invention, and desire to secure by letters patent, is the bed pieces, and tabular pieces, with lateral projections, (figures 3, 4, and 5,) as used in combination with the iron piles aforesaid; also the method of protecting the bottom from abrasion, by means of the covering thereof, with the segments or triangular boxes aforesaid, expressed by figures 7, 8, and 16; also the combination of all these parts for the obtainment of permanent foundations in deep water, for the support of hydraulic structures.

I. W. P. LEWIS.

No. 4031.

Having thus fully described the nature of my improvement in the stove for heating apartments, and shown the manner in which the same operates, I do hereby declare that I do not claim as new the causing of the draught to descend through the fuel, this having been done before, though under an arrangement and combination of parts essentially different from that devised by me and herein described; but what I do claim as new, and desire to secure by letters patent, is the manner in which I have com-

bined and arranged the respective parts of my stove, so as to allow the burning coal to rest on the solid stove bottom, without a grate, the lateral opening for the escape draught being entirely above the bottom of the stove, and leading thence into the air heating chamber; by which device the radiation is increased, and the air for the supporting of combustion is also heated on its passage to the fire: the whole combination and arrangement being substantially the same with that herein described.

SAMUEL UTTER.

No. 4032.

Having thus fully described the nature and operation of my improved triple cylinder stove, what I claim therein as new, and desire to secure by letters patent, is the particular manner as above set forth, in which I arrange and combine the flue and air-heating spaces, and the pedestal of my stove, the hot air space being between the ascending and descending draught, the descending draught spreading around the base of the stove.

FRANCIS L. HEDENBERG.

No. 4033.

We do not intend to claim any of the parts used herein as our own and exclusive invention, because each taken separately has been already used for various purposes; but we do claim as new, and of our own *invention*, the *application* of the *vertical* hat block chuck on the mandrel, driven, in any convenient manner, beneath the bed, *in combination* with the movable arm, (m) secondary arm, (p) and descending arm, (q) with the chop piece, (r) when such application and combination are employed as the means of using the horizontal bush and flexible bush for the purpose of polishing and equalizing the nap, or pile, or exterior fibrous matter forming the surfaces of hats; the whole constructed and operating substantially as herein described.

JOHN LOUDON,
THOMAS SHAW.

No. 4034.

What I claim as my invention, and which I desire to secure by letters patent, is the making of the revolving skeleton cylinder, with combined swords and bars of teeth, for the purpose set forth.

W. Y. SINGLETON.

No. 4035.

I do not claim as my invention the impregnation of meat by hydraulic or other pressure, nor do I claim the modes of producing dessication; but what I do claim is the process, substantially as herein described, of curing meat by combining the operations of impregnation and dessication, in the manner set forth.

GEO. A. SCHERPF.

No. 4036.

What I claim as my invention, and desire to secure by letters patent, is the manner in which I have combined the stirring rod, or bar, with the dropping bar or vibrating rod; and, in combination therewith, the gauge rod, with its index for regulating the amount of seed to be dropped, in the manner above described.

PIERPONT SEYMOUR.

No. 4037.

What I claim as my invention, and desire to secure by letters patent, is the machine for stuffing collars, as herein described; that is to say, the combination of the slides and wedges for stretching the collar, and, in combination therewith, the revolving table and hopper, constructed, arranged, and combined substantially in the manner and for the purpose above described.

I also claim, in combination with the form, the post and nut, sliding in guides for stretching the collar, as before made known.

WADE HAWORTH.

No. 4038.

What we claim as our invention, and desire to secure by letters patent, is constructing the former in strips, with a series of joints at or near the centre, as above specified.

We also claim the combination of a guard with the form over which the leather is to be crimped, the leather being placed between them to prevent the wrinkles, &c., as herein described.

We also claim the hooks in combination with the crimp, so as to be brought over the back of the former and pass through between the jaws, and taken out on the under side, as set forth, or they may be used in drawing up the leather and tack, &c.

We also claim, in combination with the above named guard and form, the bar in which are the screws, with a crank, for drawing up the leather, in the manner and for the purpose before specified.

REUBEN FAIRCHILD,
STARR FAIRCHILD.

No. 4039.

We claim, *first*, the manner of forming the knots by turning over the loops or meshes, already made into the form of a noose, across the whole net at once, as herein set forth, by means of a knot frame, constructed and operating substantially as described.

Secondly. We claim the manner of introducing the twine through the apertures of the nooses formed by the knot frame, by means of a needle, substantially the same as set forth in the description, in combination with the netting machine herein described.

Thirdly. We claim the manner of casting off the knots from the knot frame, and of tightening them by means of the action of the swivel, and bearing against the ends of the jacks, whilst the web of the previously formed net passes over the roller, and is held firmly in its position.

Fourthly. We claim the manner herein set forth of combining the parts

constituting the knot frame, consisting principally of the table, the counter table, three pairs of jaws attached to the table and counter table, each of which pairs of jaws is composed of two slips or pieces of metal, which are made to slide upon each other so as to open and close said jaws; the arrangement and combination of the plungers, P R, and *p r*, and of the connecting rods, by which said plungers and jaws are actuated, being substantially such as herein described and represented.

Fifthly. We claim the manner in which we have combined and arranged the jacks and the slur wheel with its carriage and their appendages, by which combination and arrangement the jacks are made to rise successively, and to draw the twine up so as to constitute a loop; the slur wheel being divided into four, or any preferred number of parts, and being moved on with the carriage, and actuated by a rack and pinion, substantially in the manner and for the purpose herein set forth.

Sixthly. We claim the manner of arranging, as formed, the twine comb, with its teeth or wires, to act against the rising meshes by the aid of the arm, acted upon by the pin in the wheel of the counter table, or in any other way that is substantially the same.

Seventhly. We claim the manner of combining and arranging the mesh frame, knot frame, twine comb, and their immediate appendages, so as to co-operate with each other, substantially as herein set forth, and for the purposes herein mentioned.

JOHN D. CORNELIUS,
JAMES MOTT, JR.

No. 4040.

What I claim, and desire to secure by letters patent, is the *lamp wick*, made or combined as above described, viz: with a strip of tape, muslin, Canton flannel, a piece of twine, or any other substance, and the candle wick attached or combined to the sides, as above set forth, or in any other way that is essentially the same, and for which I request letters patent.

Witness my hand this third day of April, A. D. 1845.

SAMUEL RUST.

No. 4041.

Having thus fully described the construction of our improved resting vat for flax or hemp, and the manner of regulating and diffusing the temperature equally through every portion of the contents of the same, while the retting process is in progress, we would remark, that we do not claim the retting of hemp or flax by means of hot or warm water, as that has been done before; but what we do claim as new, and desire to secure by letters patent, is the performing the retting process upon hemp or flax by keeping it immersed in water kept at a uniform temperature by artificial means, and that temperature not to vary more than twenty or thirty degrees from ninety of *Fahrenheit's* thermometer.

GEO. W. BILLINGS,
JOHN HARRISON.

No. 4042.

Having thus described my invention, I shall claim the combination of mechanical parts, by which the alternate elevation and depression of each of the impelling pawls which operate or give motion to the trough (through certain mechanism intervening between the said pawls and the troughs) are affected, the said combination consisting in the following parts, viz: the peculiar tilting box, (having projections to support the inner ends of the pawls and spring catches,) the weight M, (made to slide from one end of the box to the other end of it,) and the movable arms applied to the side of the trough; the whole being constructed, combined with the impelling apparatus and trough, and operating, substantially as above described.

In testimony whereof, I have hereto set my signature this fifteenth day of March, A. D. 1845.

JAMES M. WILDER.

No. 4043.

What we claim, therefore, as our invention, and desire to secure by letters patent, is the above described tools for forming hook headed spikes, and their application to said Osgood & Hunt's spike machine, which tools are so formed that when introduced into the movable die box of said machine, a projection is given to the dies, so that that part of the rod of which the head is to be formed receives the requisite bend in the operation of griping, as herein described, when the header described in Osgood & Hunt's specification of March, 1834, advances and completes the head.

JOHN F. WINSLOW,
his
ISRAEL × BLANCHARD.
mark.

No. 4044.

Having thus fully described my improvements, what I claim therein as my invention, and desire to secure by letters patent, is the combination of flues, as herein described, passing down on each side nearly the whole width of the stove, and contracting under the bottom and upon the opposite side, in the manner and for the purpose above set forth.

HENRY N. GROS.

No. 4045.

What I claim as my invention, and desire to secure by letters patent, is the mode of forming and printing the letters in stencil printing, or painting, by means of the combination of characters represented in the draught, and numbered 1, 2, 3, 4, 5, 6, 7, 8, 9, essentially in the manner described, and the nine characters so represented.

E. B. FOSTER.

No. 4046.

What I claim as new and as constituting my invention, and desire to secure by letters patent, is the giving to the gaseous current a rotary mo-

tion around a central, conical, or other formed screw, by means of a spiral thread, or threads, combined therewith, which traverse the chamber, and form spiral flues around the same, whereby the sparks and other solid particles floating in the gaseous current acquire a centrifugal force that throws them off through proper openings, into an exterior chamber, while the gases escape through the central screen, as herein before set forth.

WM. C. GRIMES.

No. 4047.

I claim as my invention the intermingling and combining fibrous substances with the gum, in forming India rubber fabrics, solid and firm in the body, with a smooth surface, resembling leather.

NELSON GOODYEAR.

No. 4048.

What I claim as my invention, and which I desire to secure by letters patent, is the combination of the drum and case with the smoke pipe, constructed and arranged, and operating, in the manner and for the purpose set forth, or other mode substantially the same for producing analogous results.

SAMUEL SWETT, Jr.

No. 4049.

What I claim as my invention, and desire to secure by letters patent, is the manner of feeding by means of the inclined feeding wedge, as before set forth; whether the operation be effected precisely in the same manner described, or in any other mode substantially the same.

I also claim the combination of the sizing gouge with the wheel and adjustable cutter, for the purpose and in the manner described.

M. W. ST. JOHN.

No. 4050.

Having thus fully described the improvement, what I claim therein as new, and desire to secure by letters patent, is the runner, constructed as herein described, having spiral wings thereon, from which project rows of pins, substantially in the manner and for the purpose herein made known, and in combination therewith; the grated concave as above set forth.

JANE A. DAVIS,
Administratrix of H. G. Davis.

No. 4051.

What I claim as my invention, and desire to secure by letters patent, is supporting the upper frame on and attaching it to the spindle on which the master-wheel turns, in combination with the mode of connecting the spindle with the lower frame by means of a turning platform, the master wheel being situated between the two frames; and there being no other connexion between the two frames than the said spindle, whereby the upper frame, which supports the belt wheels, may be turned in any direction without moving the under frame, as described.

I also claim connecting together the inner ends of the levers, by which the horses pull by joint link, the said levers being jointed to the master-wheel near its periphery, so that the horses shall perform their proportion of labor, as described.

ELIHU H. JAQUES.

No. 4052.

I do not claim the manner of effecting the elasticity of my pad by means of spiral springs, as that has before been done; but what I do claim as my invention, is combining with a pad, so rendered elastic, the cushion and stuffing thereof, in such manner that the central portion of the pad shall present a hard surface, while the portion exterior to said centre shall be of a soft, yielding nature, and at the same time exert a gentle pressure.

And I further claim, in combination with the above pad and cushion, making the concavo-convex plate project beyond the edges of the plate, so as to effectually prevent the cover of the pad from coming between the two plates, in the form and manner set forth.

DAVID B. W. HARD.

No. 4053.

What we claim as our invention, and desire to secure by letters patent, is the combination of the cross-levers with the rack and pawl, substantially as herein described. We do not wish to be understood as claiming this apparatus for a parallel motion; but, in combination with the bench-vice, as described, we believe it to be new.

We also claim the combination of the pawl for holding the rack with the nut on the screw of the vice, so that when the nut is pressed up in griping anything between the jaws, the pawl will act, and brace the lower end of said jaws in proper position.

W. H. TAYLOR,
A. P. NORTON.

No. 4054.

What I claim as my improvement, and desire to secure by letters patent, is the combination of the movable bar with the stationary teeth on the main cylinder, substantially in the manner and for the purpose above described.

THEODORE ELY.

No. 4055.

Having thus fully described my improvements, what I claim as new, and desire to secure by letters patent, is the combination of the movable balanced buckets with a water-wheel, having recesses to receive the inner ends of said buckets, in the manner and for the purpose above specified.

J. J. SPRINGSTEEN.

No. 4056.

Having thus fully described my invention in the bevel centrifugal water-wheel, and shown the manner in which the same operates, what I claim

therein as my invention, and desire to secure by letters patent, is the projecting of the beveled floats of the beveled centrifugal water-wheel up into the funnel-drift of the water in the scrolled penstocks, combined and arranged as described in the specification.

I do not intend to confine myself to the above sized wheel, which is suited only to the head and fall referred to, for the size of the wheel must correspond with the head and fall, and the inclination of the floats (which may be varied from ten to eighty degrees) must change accordingly.

JAMES LEFFEL.

No. 4057.

Having thus described our improvements, we shall only claim as our invention—

1st. The combination of the *bent lever griping jaws*, (arranged and operated by the toggles, &c., as specified,) with the movable sockets attached to the sliding frames; the whole being arranged and operating substantially as above described, and for the purpose of stretching the leather over the form.

Also, the combination with the above of a pair of pincers, capable of being applied to the leather at any point, and operated by means of a cord passing through the handles of the pincers, and attached to a revolving shaft, said shaft having a ratchet and catch, and the whole arrangement being substantially as herein before specified.

In testimony that the foregoing is a true description of our said invention and improvements, we have hereto set our signatures, this twenty-sixth day of March, A. D. 1842.

CHENEY SNOW,
THOMAS N. SADLER.

No. 4058.

Having thus fully described the nature and operation of my improvement on the above named machine for breaking anthracite or stone coal, what I claim therein as new, and desire to secure by letters patent, is the employment of pairs of rollers, to effect the breaking; one of which rollers, instead of being furnished with teeth, is perforated with holes, through which the broken coal is to pass, the other roller being provided with teeth corresponding with and entering a short distance into the holes in the first named roller, in the manner and for the purpose set forth; said rollers being geared together, and otherwise operating in the same manner as the within named machine of Joseph Baltin.

BENJ'N HAYWOOD.

No. 4059.

Having thus fully described my improvement, what I claim therein as my invention, and which I desire to secure by letters patent, is the method of using the rum, as above specified, in potting sugar; that is to say, by wetting each layer with the rum as it is potted.

I also claim the conical perforated tubes inserted into the hogshead, through which the molasses runs, which can be cleared by a stick, or otherwise, on the inside.

In witness whereof, I hereunto subscribe my hand before the witnesses under named.

IDE BRETTON, Sr.

No. 4060.

Having thus fully described the nature of my improvements in the spring latches and locks, what I claim therein as new, and desire to secure by letters patent, is the manner, herein described, of arranging and combining the piece which forms the spring-catch with the box of the lock, and with the stirrup by which it is forced forward; the said catch being attached to the box and to the stirrup by means of joint pins, so that its operation shall be substantially the same with that herein set forth.

JACOB ALRICHS.

No. 4061.

Having thus fully described the manner in which I construct my improved saddle, what I claim therein as new, and desire to secure by letters patent, is the converting the same into a spring saddle by means of a spring-bar of steel, bent into the form of the outer edge of a cantle, so that the straining girths may extend therefrom to the pommel, thereby giving elasticity to the seat, as set forth.

I likewise claim the manner of combining the stirrups with the saddle, by allowing the stirrup straps to pass over staples or rods, which are free from the saddle at the rear ends; by which device the stirrups will be detached from the saddle in case of their being drawn back by the falling of the rider, or otherwise.

I do not claim the forming of such staples or rods as new in the abstract, but limit my claim to their employment as a means of connecting the stirrups with the saddle, by which an important improvement is effected.

ROBERT CALDWELL.

No. 4062.

What I claim as new, and my own invention, in the within above described inkstand, is the introduction of a float, with a soft, yielding, or elastic upper surface, and so formed as to operate at all times, either as a stopper to the ink tube or a floating cover to and upon the surface of the ink in said stand, arranged substantially in the manner and for the purposes herein above set forth and described.

WALTER HUNT.

New York, *July* 12, 1844.

No. 4063.

What we claim as our invention, and desire to secure by letters patent, is the manner of arranging the pivots, in combination with the levers and bars, and guides or arms, operating in the manner and for the purpose set forth.

CHESTER STONE,
GEO. S. COLLINS.

No. 4064.

I do not claim the introduction of the smoke, heat, or other volatile products of combustion, to the sides of an oven, or a cooking range, through lateral flues proceeding from the boiling chambers; nor do I claim (as is claimed in certain letters patent numbered 3589, and dated May 17, 1844) carrying the lateral flues, or those proceeding from the boiling chambers, directly against the *front parts, or halves*, of the sides of the oven, and thence vertically, and thence horizontally *over* and in contact with the top thereof, and opening the same at the top of the oven into a discharge flue, in combination with carrying the main discharge flue of the fireplace beneath, and in contact with the underside of the oven, and around and in contact with the *rear parts*, or *halves*, *of its sides and top*, (whereby the rear parts of the sides are heated by the *central flue*, or that proceeding from the grate and under the oven,) and thence into the chimney or discharge flue; nor do I claim (as in my letters patent numbered 2990, and dated March 4th, 1843) causing the heat and smoke to circulate against the sides and bottom of an oven, by means of lateral flues proceeding from the boiling chambers and entering the sides of casing surrounding the oven, in combination with two horizontal and vertical partitions, arranged between the oven and its surrounding casing, by which the smoke and heat are caused to come in contact with the front part, *or a portion only* of each of the sides of the oven, and from thence to pass *underneath* the oven; but that which I do claim is the *particular arrangement* of flues on the *front* of the lower part of a chamber, on each *side* of the oven, and making it pass to the rear by means of a horizontal plate; thence upwards and over the plate, and towards the front of the chamber, and thence through an opening into the smoke chamber on the top of the flue plate, in *combination* with carrying the central flue of the fireplace directly under the bottom of the oven, upwards, and around its rear end, and over its top plate; thence into the before-mentioned chamber in the top of the flue-plate; by which arrangement I equally or uniformly spread heat over the whole of the sides of the oven by the action of the lateral flues alone, and *independently* of the central flue, for the purpose of heating the *bottom*, *end*, *and top* of the *oven* only; by which improved arrangement of central and lateral flues, I am enabled to gain certain very important advantages in baking evenly and without burning the articles in the oven, as I can apply a current of smoke and heat either to the whole exterior surface of the side of the oven, without making it pass against the top, rear end, and bottom thereof, and into the chimney, or I can make it pass in contact both with the sides, bottom, end, and top, and into the chimney, when desirable.

Also, I claim, in combination with the above, the making a narrow opening, or communication, between the side flues and central smoke flues at the top of the oven, for the purpose above set forth; the same being effected by extending the flanch plate down from the flue plate, and away from the oven, as above described.

In testimony whereof, I have hereto set my signature this 29th day of April, A. D. 1845.

MOSES POND.

No. 4065.

What I claim as my invention, and desire to secure by letters patent, is the combination of the following particulars: 1. The suspension of the carriage body or box upon vibrating arches. 2. The pin or guide, and its appendage, the semicircular hoop; and, 3. The swivel in the reach; all of which as herein described.

ARNOLD HOSMER.

No. 4066.

What I claim as my invention, and desire to secure by letters patent, is the manner in which I have combined the apartments of the bellows by means of the flexible tube and the arrangement of the apertures and valves, as set forth.

WM. LILLIE.

No. 4067.

I claim the combination of the upright column or post, by which the showering apparatus is sustained while being elevated or depressed, with the portable box, as described; the said column consisting of the sections or pieces, having two dovetailed grooves in the front side of each of the sectional parts, &c., and each having a dovetailed tenon made to fit the dovetailed groove, as above set forth, and having a flexible cord or chain, with a screw and nut at one extremity and a head at the other, for drawing the parts together; the whole being constructed for the purpose of portability, and being packed within the bottom or reservoir, and operating substantially as above set forth.

I also claim the folding box, as herein set forth; that is to say, the two halves of said box, constructed with the side, when they are hinged, removable, and their edges that come together, when covered with India rubber, as herein set forth, or with other suitable substance, so that when they are opened, and the cambering cleats screwed on to the bottom, they shall form a water-tight joint, the reservoir being without any extension or partition across its central part, such as must exist if two boxes having two sides were employed, and which would interfere with the feet of the bather.

In testimony whereof, I have hereto set my signature this 26th day of April, A. D. 1845.

J. CUTTS SMITH.

No. 4068.

Having thus fully described my improvements in boot patterns, what I claim as my invention, and desire to secure by letters patent, is combining the plates, in the manner described, by means of the curved slot and straight slot, arranged in the manner and for the purpose set forth. I also claim the combination of the draught piece with the slide, in the manner herein specified.

I also claim, in combination with the front pattern, the separate pieces for measuring the toe and instep, as set forth; and, lastly, I claim the combination of the index *y* with the index on the toe piece E, for the purpose above specified

JOSEPH RIDER.

No. 4069.

What I claim as new and constituting my invention, and desire to secure by letters patent, is giving to the gaseous current a rotary motion around a cylindrical or other formed screen, by giving to the upper part of the chimney a curved, coiled, or convoluted form around the screen, substantially in the manner as herein before shown, as set forth.

WM. C. GRIMES.

No. 4070.

What I claim as my invention, and desire to secure by letters patent, consists in a mechanical arrangement, which so combines an index, constructed of cross hairs or spider-web lines, intersecting each other at right angles, or a dot on a plain lens, or any other similar contrivance, placed in the focus of the eye-glass of a telescope with a pencil, crayon, blunt point, or other marking implement, that when said index is apparently made to pass over the outlines of any object seen through the telescope, the said crayon, blunt point, or other marking implement, shall trace said outlines, as herein described.

ERASTUS WOLCOTT ELLSWORTH.

No. 4071.

We are aware that the hemp or flax has been broken or cleaned on a cylinder of knives, the whole set of beaters or breakers striking at once between the knives as they rotate, and therefore it will be understood that we do not claim this general character or principle; but what we do claim, and desire to secure by letters patent, is the arrangement of the beaters or scutchers to strike one after the other in succession, in combination with the continuous movement of the bed of knives or slats, as described and represented herein.

GEO. W. BILLINGS.
JOHN HARRISON.

No. 4072.

The parts of the above described machine which I claim by right of original invention, are—

First, the method of bringing the mould to and from the nipple by placing it upon what I call the crane, whose centres of motion are vertical, thereby allowing the mould a horizontal movement, as described; also, as forming part of the arrangement of this crane, the adjustable socket for the upper centre; also, as forming part of said arrangement, the slide, with rod.

What I claim as my invention, and desire to secure by letters patent, is the combination of the slide and rod with the horizontal moving crane, substantially as in the manner described; the crane receiving its reciprocating motion from the combination of the crank shaft, cam R, roller U, connecting link, rocking shaft, lever, and weight, or by other means substantially the same.

I also claim the arrangement of the adjustable socket for the upper centre

of the crane, as described, for adjusting the mouth of the mould to the orifice of the nipple plate, in combination with the crane.

DAVID BRUCE, Jr.

No. 4073.

What we claim as our invention, and desire to secure by letters patent, is the combination of the gang of knives or cutters with the roller, for cutting the threads or strips, according to the principle above described.

HORACE H. DAY,
HENRY G. TYER,
JOHN HELM.

No. 4074.

Having specified the characteristics of this wheel, and the manner of constructing the same, I wish it to be distinctly understood that I do not claim as my invention the form of the concentric part of the channels or water passages in the arms, nor simply making the arms eccentric, nor the employment of regulating valves at the issues of the channels, as these, separately, are well known; but what I do claim as my invention, and desire to secure by letters patent, is combining with the concentric, eccentric continuations of the channels, for the purpose and in the manner substantially as herein described; and I also claim the employment of the hinged and adjustable valves or shutters, which regulate and gradually reduce the capacity of the issues, and afford the ready means of removing obstructions from the channels, or water passages, in combination with arms having channels or water passages, of equal capacity, from end to end, as herein set forth.

T. R. TIMBY.

No. 4075.

Having thus fully described the nature and operation of my improvements in the mode of breaking and dressing hemp, &c., what I claim as my invention, and desire to secure by letters patent, is the combination and arrangement of the series of smooth, pressing, and bending rollers, revolving in the same direction, and with the same speed, for the purpose of loosening and separating the boon from the fibres, the same operating substantially as herein set forth; and these, thus combined and operating, I claim in combination with the holding rollers and beating cylinders, or either of them, substantially in the manner and for the purposes herein set forth.

RICHARD DEERING, Sr.

No. 4076.

I therefore claim as my invention the giving to the cutter a rotary motion on its axis, as it is carried around by the main shaft, as herein described, or in any manner substantially the same.

WILLIAM WRIGHT.

No. 4077.

Having thus fully described the manner in which I construct my stove, what I claim therein as new, and desire to secure by letters patent, is the combining of a cylindrical stove, furnished with a grate at each of its ends, with a drum, within which it may be inserted, in the manner and for the purpose set forth—the respective parts being constructed and arranged substantially as described.

CHARLES BABCOCK.

No. 4078.

What I claim as my invention, and which I desire to secure by letters patent, is the combination of the arrangement of the flues, with the division plate, as set forth.

THEOPHILUS SMITH.

No. 4079.

What I claim as my invention, and desire to secure by letters patent, is the contrivance, as above set forth, for raking the ear on both sides of the centre, first down and then up. The arrangement, for this purpose, of the flanges, and their combination with the spurs of the wheel, I claim and wish patented.

JOSEPH D. BRIGGS.

No. 4080.

What I claim as my invention, and desire to secure by letters patent, is the screen, composed of strips of metal of a curved form, constructed and arranged as above specified.

I also claim constructing the cylinder and concave with wrought iron hoops, as described, projecting from the surface and fastened with staples that form teeth therein, in the manner and for the purpose above made known.

HENRY HIZER.

No. 4081.

What I claim as my invention, and desire to secure by letters patent, is a mode of constructing a submerged wheel for propelling boats with paddles, having a compound motion, such as to cause them to enter into and recede from the field of effective action edgewise, and, when out of the field of effective action, to move edgewise inertly from the point of recession to that of dipping, in the form and manner and for the purpose set forth in the foregoing specification.

SAMUEL B. HOWD.

No. 4082.

Having thus described my improvement, and its application to a piano forte, I shall state my claim as follows:

What I claim as my invention, and desire to secure by letters patent, is combining an additional octave string to each note of the piano forte, in the manner described; that is to say, by causing said strings to be raised, at the head or right hand end, a little above the strings that form the note, while at the opposite end they are depressed sufficiently to bring all the strings to a level at the point where the hammer strikes them.

I also claim placing the secondary bridge, or that nearest the right hand end of the instrument, in an opening made for that purpose in the plate, through which the bridge projects, a little higher than the one immediately in front of it; the hitch pins of the common strings being in that part of the plate that is between the two bridges, and those for the octave strings being beyond the secondary bridge.

I also claim the combination of the brace with the plate, for the purpose of supporting that part of said plate between the bridges; it being attached thereto by screws or otherwise, as herein fully set forth.

Lastly, I claim, in combination with the elevated strings, the crooked damper, in the manner and for the purpose described.

In testimony that the foregoing is a true description of my said invention and improvement, I have hereto set my signature this ——— day of June, in the year eighteen hundred and forty-five.

SIMON W. DRAPER.

No. 4083.

Having thus fully described my improvements, and pointed out their uses, what I claim as my invention, and desire to secure by letters patent, is the combination of a pattern, in any style for cutting garments, with scales for regulating the sizes thereof, substantially in the manner herein set forth.

S. B. STILLWELL.

No. 4084.

The improvement which I claim as my invention, and desire to secure by letters patent, consists in making a transparent concentrated or solidified jelly, containing all the ingredients so combined, concentrated, or solidified, that the article may be kept in a perfect state of preservation for any length of time, and be in a portable form for the supply of shipping, families, or for exportation, and requiring only the addition of the prescribed quantity of hot water to dissolve it when it, may be poured into glasses or moulds, and, when cold, will be fit for use.

PETER COOPER.

No. 4085.

What I claim as my invention, and which I desire to secure by letters patent, is the peculiar mode of combining the auger with the stationary base affixed to the timber to be bored, as described, so that a mortise can be bored in any direction of the compass of the machine without moving the base, by means of the frame, in which the auger is situated, sliding on ways to and from the standard attached to the base around which said ways revolve, and upon which they are elevated and depressed—the whole being

constructed and arranged substantially in the manner and for the purpose above made known.

JAMES B. COFFIN.

No. 4086.

What I claim as my invention or improvement, and desire to secure by letters patent, is the above described method of preserving food in hot places, seasons, or climates, in a *fresh*, *dry*, *cold air*, without the *immediate* presence of ice, or other cause, to produce *humidity;* and this I claim to do, either by creating a partial or almost entire vacuum, or by blowing or pumping in the air, in manner aforesaid; this fully and effectually causing *ventilation*, by air at a low temperature, and thereby better preserving from decay animal, vegetable, and other substances, liable to be destroyed by the presence of *heat* and *moisture*.

I also claim the right to construct, use, and vend the same, and to apply the coil of pipe, tubing, or cylinder, as also the air-pump, force-pump, or bellows, to vessels, or any apparatus already made and used, or intended to be made and used, as refrigerators, for the preservation of food, &c., in the manner aforesaid.

THOMAS H. KING.

No. 4087.

What I claim as my invention, and which I desire to secure by letters patent, is the mode of entrapping the drone bees in the lower box of chambers, within sight of and adjacent to the working bees, by means of the additional screen, in combination with the openings in the inclined bottom of the box, whose outlets are out of sight of the bees from the outside, and through which the drones are caused to pass from the inside of the body of the hive, as set forth.

I likewise claim the manner of extending the working capacities of the hive, by means of the inclined plane or way, and groove in the lower part of the frame, operating on the wheels, secured to the upper section of the hive, and the tongue or projection on the lower part of the base, on the principle of a wedge, and raising the upper section with the interior boxes sufficiently high from the lower section to admit the insertion of another box below the inner range of boxes, as set forth.

I also claim the arrangement of the entrance in combination with the drone trap, as described.

I likewise claim the combination of the inner tier of boxes with the outer range of hives, elevated by the inclined planes, as set forth.

CLARK WHEELER.

No. 4088.

In the foregoing described first and second variety of woof protection, I claim as my improvement, and desire the same secured to me accordingly, the hanging of the combs or limbs, before described, upon the race beam *itself*, in such manner as to sink to the face of the race as the lay moves back to admit the shuttle to pass smoothly over it, and rise immediately after, (if there be no woof thread,) bringing the protecting finger in contact

with the latch or cast-off, arresting the lay in its *first* downward progress, and *instantly* stopping the loom.

ENOCH BURT.

No. 4089.

What I claim as my invention, and desire to secure by letters patent, is—

1st. Making the external cone in segments, having adjustable metallic teeth or grinders between them, the said teeth being adjusted by the means above described, or any other substantially the same.

2d. The regulating the admission of the grain to the mill by means of the revolving gauge, as above described.

JESSE FITZGERALD.

No. 4090.

Having thus described our machine and its improvements, what we claim as our invention, and desire to secure by letters patent, is the combination of the bar and the toothed arms on the double-nut shaft running between the straight-toothed bars with the bark mill, constructed and arranged in the manner and for the purpose described.

A. P. NORTON.
MORRIS OWEN.

No. 4091.

Having thus fully described my improvements in sawmills, I wish it to be understood that I do not claim a self-setting sawmill, irrespective of the means used in effecting it, as that has before been essayed; but what I do claim as my invention, and desire to secure by letters patent, is the apparatus herein described for self-setting the log, and self-operating carriage motion; that is to say, the combination of the lever, bars, and cord, and shipper, with the sawmill, constructed and arranged in the manner and for the purpose herein described.

HENRY QUIN.

No. 4092.

What I claim as my invention, and which I desire to secure by letters patent, is the before described arrangement of the vibrating hand in combination with the revolving cradles, operated by the lever and eccentric grooved wheel or plate at the head of the axle of the cradle.

ERASTUS C. WEST.

No. 4093.

What I claim, and desire to secure by letters patent, is the arrangement and combination of the furnace and boiler, or other similar heating apparatus, with the drying and watering houses, railways, and watering apparatus, as above described.

I also claim as new, and as my invention, the peculiar construction of the watering-house, and the mode of managing the hemp, by putting in an

upright position on railroad cars, and subjecting it to the process of preparation, either in watering-houses or in pools of water, and while on the cars, and in an upright position.

I do not claim to be the discoverer of the mode of preparing unrotted hemp by the heating process: this is claimed by Mr. James Anderson, of Louisville, Kentucky, and I have referred to this method of preparation, in the manner above described, with his permission.

RICH'D DEERING, Sr.

No. 4094.

What I claim as my discovery, and desire to secure by letters patent, is the above process of preparing hemp or flax by first steeping it in warm water until it is completely macerated, and then, as soon as it has been brought to this macerated condition, the temperature of the water is to be immediately raised to or above the boiling point, by which means the further progress of fermentation and putrefaction is stopped; and by continuing the boiling of the water a rapid and complete separation of the gluten from the fibre is effected.

THOS. H. BARLOW.

No. 4095.

What I claim as my invention, and desire to secure by letters patent, is the aforesaid mode, and others substantially the same, of graduating the pressure of a truss by a screw, in combination with the additional plate or back, and main spring.

WM. R. GOULDING.

No. 4096.

These additions and modifications to and about the common ship anchor, and their application, for the purposes herein minutely described, are improvements which we claim to be of our own invention, which are briefly enumerated as follows:

1st, the method by which the cable is prevented from fouling upon the stock of the anchor, by attaching protections to the extremities thereof, which extend down and are fastened to the shank at a point below the trend of the shank. These protectors, from their oblique position, clear the cable whenever it touches it. They also obviate another difficulty which is frequently presented, when the anchor is lashed to the cathead, which secures in the entangling of the ropes, and the obstructing and tearing of the sails upon the portion of the naked stock which stands above the gunwale; this is prevented by warding off whatever comes in contact with it.

2d, the mode of protecting the arms of the anchor against the fouling of the cable, by means of movable plates of metals attached to the flukes by means of rings, or hinges, and covering the entire arm—the same being combined and operating as herein set forth. The inner ends of these plates move longitudinally upon ridges or projections made upon each side of the shank by means of a connecting chain or rope, by which, when the one plate is forced down upon the arm of the anchor, the other is drawn up to

a position at right-angles, or nearly so, with the shank; so that when the arm lies buried in the soil, the opposite one stands defended by the raised plate against the fouling of the cable, which plate assumes a position nearly perpendicular to the soil.

3. We also claim, for clearing the cable from off the arms of the anchor whenever it comes in contact with it, the combination of the hinged sliding plates with the two guards of the same curvature of the arms and crown, consisting of narrow strips of iron extending from fluke to fluke, and welded upon the sides of each. These guards are also attached to the crown of the anchor by means of a short shoulder, leaving a space between them and the arms of the anchor.

These guards, so situated, create a great width across the crown of the anchor, presenting a form as shown in fig. M, by means of which width, and the curvature of the guards, it is impossible to foul the cable effectually upon the arms, and it requires but the smallest force to cause the anchor to cant and bite the ground. The space left between the guards and arms presents a means by which the fish hook can be fastened about the guards or arms in such a manner as to fish the anchor.

N. P. ISAACS.
JAMES RAISBECK.

No. 4097.

As most of the parts herein described and employed have been used for other purposes, I do not intend to claim as new, or of my own invention, any of such parts, irrespective of the uses for which I have employed them, and therefore I limit my claims as follows:

I claim as new, and of my own invention, and desire to secure by letters patent, the manner of combining the barrel disks with the wheel, for the purpose of hoisting, lowering, or suspending weights by means of the ribs and grooves, or any analogous device; and I claim the further combination therewith of the means employed to govern and regulate the action of the said parts, namely, the friction bands g or g', and levers h or h', the attaching and detaching lever or rolling shaft and bit, 4 or 4', pin 3 or 3', and slide key 2 or 2', substantially as such manner and combination are shown and set forth, irrespective of the power employed to work the machinery, and also irrespective of the mode by which the power is connected to the working parts.

In witness whereof, I have hereunto set my hand, in the city of New York, this twentieth day of March, one thousand eight hundred and forty-five.

EPHM. MORRIS.

No. 4098.

The invention claimed, and desired to be secured by letters patent, consists in the arrangement of the day circle, with its index, in combination with the globe, mounted upon the oblique axis, and, in combination therewith, the calendar and analemma.

SILAS CORNELL.

No. 4099.

I claim the above new manufacture, or the combination of the two elas-

tic materials, stocking-knit fabric and caoutchouc, whether the latter be applied to the exterior surface or surfaces of said fabric, or between two or more pieces or layers of said fabric or cloth, substantially as set forth.

In testimony whereof, I have hereto set my signature this sixteenth day of June, A. D. 1845.

CHARLES GOODYEAR.

No. 4100.

' What I claim as my invention, and desire to secure by letters patent, is the mode of forming the spring-seat of the saddle by means of the springs hinged to the pommel, and the free ends of said springs moving or sliding in copper, brass, or other metallic grooves, or upon rollers of copper, brass, or other suitable metal, as set forth.

J. F. LEHR.

No. 4101.

What I claim as my invention, and desire to secure by letters patent, is the combination of the vibrating-box and convex washer placed therein, constructed, arranged, and operated in the manner and for the purpose set forth.

I likewise claim constructing the washer with an opening in the bottom, provided with a shutter for holding a part of a garment between the convex surface of the washer and the concave surface of the bed, whilst the body of the garment is within the box, as described.

HARRISON HAGANS.

No. 4102.

What I claim as my discovery, and the advantages of which I wish to secure to myself and my legal representatives, by obtaining letters patent, is the admixture or combination of coalaphane, either with asphaltum, or rosin, or pitch, or turpentine, or balsam, or prepared linseed oil, or caoutchouc, or with any of the materials known as rosins, gum-rosins, and bitumens, or with any two or more of them, and with lamp-black, or Frankfort black, or other dark-colored matter, in such due proportions as to form *printers' ink ;* and the proportions before given varied by the judgment of the manufacturer, according to the consistency of the mixed materials used, will be found to effect the object.

EDWARD CLARK.

No. 4103.

Having thus fully described the nature of my improvement in the manner of reducing those ores of iron which yield forty-five per cent. and upwards of that metal, and having also shown the manner of performing the same, what I claim therein as new, and desire to secure by letters patent, is the mode of manufacturing wrought or malleable iron in a reverberatory furnace, by combining said ores with carbonaceous matters in the proportions herein indicated, and in otherwise treating them, substantially in the manner above made known.

I also claim, in combination with the said process or manner of procedure, the reducing of pig or other cast iron to the malleable state, along with the ore which constitutes the original charge, as herein described; this latter claim being specifically limited to the reduction in combination with the process referred to in the first claim above made.

WILLIAM NEALE CLAY.

No. 4104.

What I claim as my improvement on the hydro-oxygen blow-pipe, and in the processes for supplying this instrument with gas, and desire to secure by letters patent, is as follows:

In the first place, I claim the employment of more than one jet pipe, or several jet pipes, so associated as to produce a large flame by the combination of several smaller flames or jets; or of one jet pipe, so crammed with coarse wire as to cause the gaseous mixture to escape into the air at the point of efflux in several jets, as already described, in lieu of one, as in using the instrument originally invented by me, and in all subsequent modifications prior to the one for which I now desire a patent; for, although in the concentric pipes used first by me, and afterwards by Daniells and Maugham, the hydrogen escaped from the pipe so as to mingle with the oxygen passing out through another, still, more than one pipe or one aperture yielding one jet was not used for the efflux of the mixture of the two gases employed. Moreover, although tubes, crammed with fine wire, have been employed as safety-tubes to prevent the retrocession of the flame, coarse wires have never been heretofore used to cram the tube at the point of efflux, so as to divide the gas at the place of inflammation.

I also claim the employment of a jet, which may be made from between two flat surfaces, whether channelled or not, or, in other words, from a fissure or keef, or row of holes, as set forth.

I likewise claim the refrigeration of the jet pipe or pipes, by passing it or them through a case or box filled with water or other refrigerating substances, as heretofore described and represented in plate 1, figure 3.

I claim, also, the employment of a vessel provided with a tray and rod, like that last described, in combination with another vessel of the same capacity, of which the bottom is above the middle of that first mentioned, both vessels communicating by means of adequate pipes and cocks, so that the gas may pervade both simultaneously, or, by shifting a cock, may be prevented from reaching the additional vessel; after which, the acid being driven into the second vessel, its contact with the zinc is prevented or diminished, as more fully made intelligible by the accompanying description and drawings.

I further claim the employment, for the support of the platinum, of a brick, of kaolin or other infusible earth, resting on a platform so balanced on a point, or a ball, or in any other way, as to be kept horizontal by attaching to it a weight, and supported by a lever twining on a universal joint, and as represented in plate 2, and heretofore described.

I claim, also, the employment of any variety of carburetted hydrogen for the fusion of platina, in lieu of hydrogen, in the apparatus above described.

ROBT. HARE.

No. 4105.

Having thus fully described the arrangement of the respective parts of my improved fan mill, and explained the operation thereof, what I claim therein as new, and desire to secure by letters patent, is the manner in which I have arranged the screen and the chess-board, and combined them with the screens ordinarily used, so as to obtain two distinct currents of wind, and to subject the falling grain to the stronger current below the screen and chess-board, thereby blowing off the heavier portions of foreign matter, whilst the chaff is blown off by the ordinary currents in the upper compartments of the shoe.

ISAAC T. GRANT.

No. 4106.

Having thus fully described the manner in which I construct, combine, and arrange the respective parts of my self-adjusting screw finisher, what I claim therein as new, and desire to secure by letters patent, is—

First, the manner in which I arrange the horizontal ring or zone, and its surrounding tubes, for receiving the blanks, in combination with the apparatus by which said ring or zone is made to revolve to the requisite distance to bring a fresh blank opposite to the cutter after a screw has been finished.

Secondly, I claim the manner in which I have combined the cam-wheel, the vertical cutter, slide, and the lever thereon which sustains the cutter, so that the respective parts shall co operate, substantially as set forth.

Thirdly, I claim the gauge wheel, with the inclination of its projecting rim, and the recesses thereon, in combination with the spring lever upon which said rim operates, by which the cutter is brought into contact with and removed from the blank which is being cut, as described.

Fourthly, I claim the manner in which I have combined the stationary and sliding frames of the screw-driver with the vertical shaft, and with the lever which bears on the revolving ring, so as to raise and lower said screw-driver, in the manner and for the purpose herein set forth.

And it is to be distinctly understood that I do not intend by the foregoing claims to limit myself to the precise arrangement or form of the respective parts as herein represented, but vary these as I may think proper, whilst I attain the same end under an arrangement and combination substantially the same.

CULLEN WHIPPLE.

No. 4107.

Having thus fully described the nature of my improved ditching and road plough, and shown the manner in which the respective parts thereof operate, what I claim therein as new, and desire to secure by letters patent, is, first, the manner in which I have combined the wheel and the lever, or tiller, with the beam of the plough, for the double purpose of guiding and of raising or lowering the fore-end of the mould board, as set forth.

I claim the manner of combining and arranging the wheel with the plough, by means of its cranked shaft and treadle, thereby enabling the attendant, who rides upon the seat, to raise the rear end of the mould-board, and to depress the point, as described.

I also claim the combining of the horizontal wheel, and the plank, or

piece which it sustains, with the plough, thereby enabling the instrument to form a trench of increased width, when required.

DANIEL S. STAFFORD.

No. 4108.

Having thus fully described my apparatus, and the process of manufacturing sugar, what I claim therein as my invention, and desire to secure by letters patent, is—

First, I claim the method of renewing or restoring the animal charcoal, as herein set forth, by means of the revolving cylinder, placed over two fires, in the manner specified, by which it is heated gradually to the proper temperature.

Second, I claim the employment of a series of horizontal tubes, placed one above another in the manner described, having a current of steam passing through them, and the cane-juice flowing over their exterior surface, by which the steam is condensed, and the juice is somewhat concentrated; thus serving the double purpose of a condenser and an evaporater, as herein before described; said condenser being attached either to the vacuum pan or exhaust pipe of the steam engine.

C. L. DEROSNE.

No. 4109.

What I claim in the above as my invention is the combination of a coupling lever, which, together with its support, is capable of being moved up or down, or not, as the case may require, and its wires TT, and regulating buttons or nuts, (*p h* of keys B and C, or *g p* of keys B and A,) and a lever, and auxiliary hopper or fly, (or other substitutes of like character,) applied to any two keys or key levers of a piano forte, for the purpose of sounding the strings of both keys by striking upon one of the keys, as above described.

And I also claim the combination with the hopper which is applied to the key levers, for the purpose of elevating the parts above, and the hammers of the vibrating bar or apparatus, by which said hopper is thrown out of action, upon the parts above it, the same being for the object or purpose, as herein before specified.

And I also claim the mechanism of combination, by which I am enabled at pleasure to effect the action of a key above or below the key struck by the performer, the said mechanism consisting in the movable board, made capable of being raised or lowered by pedal levers, the respective regulating buttons or nuts *p h* of the keys B and C, and *g p* of the keys B and A, the said nuts being arranged upon their wires, and the whole of the said mechanism being operated and applied to the other parts of the action substantially as described.

In testimony whereof, I have hereto set my signature this eighth day of April, A. D. 1845.

SAMUEL R. WARREN.

No. 4110.

What I claim herein as new, and desire to secure by "letters patent," is

the discovery of the peculiar principle or feature exhibited in the accompanying drawings and specification, to wit: Regulating the bed or platen of toggle joint and other presses (to suit various sized bales or packages) by its connexion with some moving part of, or connected with, the press, and the *holding* said platen at *any* and *all points* of its range, with equal power or force of resistance, as is indicated by the position and power of the press, and in accordance with the size of the bale, using for that purpose any known mechanical arrangement that will produce the intended effect, as herein set forth.

S. W. BULLOCK.

No. 4111.

I am aware that conical propellers have been heretofore proposed to be used, but these differed materially from that herein described, they having been furnished with propelling vanes, buckets, or threads, set spirally on the outside of the cone; and to such propellers I do not therefore make any claim; but what I do claim as new, and desire to secure by letters patent, is the within described manner of forming a propeller for steamboats and other vessels, by placing vanes or buckets within a hollow cone, which is made to revolve with its open mouth, or base, in the direction of the vessel's wake, and its apex pointing towards the bows; the whole combination and arrangement of the respective parts being substantially the same as those herein set forth.

HORATIO HUBBELL.

No. 4112.

I wish it to be understood that I do not claim the mere addition of a separate casting or shoe to prevent wear; but, having thus fully described my improvements, what I claim therein as my invention, and desire to secure by letters patent, is the combination of the shoe with the mouldboard of the above described plough, in the manner and for the purpose described, so that the plough shall always run in the proper position.

SAMUEL SHEARER.

No. 4113.

What I claim as my invention and improvement, and desire to secure by letters patent, is the combination and arrangement of the mould-boards H and I, formed in the manner and for the purpose above described, with the twisted bottom, and wing, and base, and adjustable cutters, as herein before described. I make no claim to the other parts of the machine, as they are common to all ditching machines.

ROBERT COMMINGS.

No. 4114.

What I claim as my invention, and desire to secure by letters patent, is the combination of the revolving beating cylinder, movable and adjustable rest, and hinged concave, all arranged and operating with the flue and

screen, substantially in the manner and for the purpose described and set forth.

COLEMAN C. ESTES.

No. 4115.

What we claim as our invention, and desire to secure by letters patent, is the combination of the spring pulley with the cylinder of the threshing machine, as above described.

We also claim the spring beaters, as above described.

Thirdly, the changeable or movable frame, as described.

Given under our hands this sixteenth day of May, 1845.

JOHN T. WARREN.
EDMUND WARREN.

No. 4116.

What I claim as my invention, and which I desire to secure by letters patent, is the manner in which I construct my hive, as before described; that is to say, placing the small boxes, usually called the honey boxes, below the main hive and entrance, substantially in the manner described; the mode practised by all others being to place the honey boxes above the entrance for the bees.

ELIAS PARKS.

No. 4117.

What I claim as my invention, and desire to secure by letters patent, is the manner of combining the plates with each other, and with the box, the whole being constructed, arranged, and operates, as above described, and substantially for the purpose set forth.

AUGUSTUS HAMANN.

No. 4118.

Having thus fully described my ventilating hat, what I claim as new therein, and desire to secure by letters patent, is the combination of the perforations in the side of the hat and lining, surrounded and protected by a metallic plate on the outer side, the adjusting plate for opening, closing, or regulating the size of the apertures in the same, with the open or wire banding covering the same; all arranged and operating substantially as herein described and set forth.

In testimony whereof, I, the said John N. Genin, have hereto subscribed my name, in the presence of the witnesses whose names are hereto subscribed, on the twenty-seventh day of May, A. D. 1845.

JOHN N. GENIN.

No. 4119.

Having thus fully described our improvements, what we claim therein as new, and which we desire to secure by letters patent, is the combination of the fireplaces with the flue, constructed, arranged, and combined in the

manner and for the purpose set forth; the pipe which connects the fire *a* with the fire *b* being made to divide the descending flue.

And we also claim forming the flue under the stove, in the manner described, so that the draught shall be principally thrown to the sides, without being entirely cut off in the centre.

ELIAS JOHNSON.
DAVID B. COX.

No. 4120.

Having thus described our machinery, we shall state our claims as follows:

What we claim as our invention, and desire to secure by letters patent, is the method, herein above described, of copying or forming the longitudinal irregularities of piano legs, and other similar articles, on rough blocks of wood, by means of a carriage moving *horizontally* against the *revolving* cutter, and holding both the pattern and the rough, the cutting tool being raised and depressed, for depths of cut, by rollers resting on the patterns, the whole method or *modus operandi* being substantially as herein set forth.

In testimony that the foregoing is a true description of our said invention, we have hereto set our signatures, this eighteenth day of April, A. D. 1845.

WARREN HALE.
ALLEN GOODMAN.

No. 4121.

What I claim as my invention, and desire to secure by letters patent, is the combination of one of the steering ropes with the spring bolts, through the medium of the balance lever, or its equivalent—substantially in the manner and for the purpose herein set forth.

JOHN T. KIMBALL.

No. 4122.

Having thus fully described my improvements, what I claim as my invention, and desire to secure by letters patent, is the cutting holes through the body and lining of the hat, and leaving the outside plush whole, or merely piercing it without cutting away any portion, so that the nap shall cover said holes, and render them invisible on the outside, while a free circulation is maintained through the hat, as described.

I also claim, in combination with a hole or holes in or near the top of the hat, a hole or holes at some distance down the side of the hat, just above the top of the head, to cause a circulation through the hat, as set forth.

I also claim the combination of the ornamental cup with the hat, as described, which allows ventilation unobstructed, and prevents the rain from entering.

G. W. CHERRY.

No. 4123.

What I claim as my invention, and desire to secure by letters patent, is the combination of the reciprocating carriage with the pressure rollers, in the manner described, so as to give the pressure both ways, in the manner set forth, by which brick is made either from crude clay pulverized, or sand or slop brick is manufactured.

J. PARSONS OWEN.

No. 4124.

I claim as my invention the employment of a series of tubes or pipes, having projections and pinions (with or without teeth) placed at intervals along the length of pipes or tubes as above described, and a piston having a "rack" attached, and a "rack" attached to the carriage or carriages, or vessel or vessels, to be propelled, or any like or similar arrangements of a "rack," or "band," or "rope," which might be made to act in like manner upon the said pinions or upon each other, to produce the effect, as above described, upon an atmospheric railway. I do not claim any of the separate parts of my apparatus, all or some of them being well known; but I claim the same in combination, for the purpose of carrying out practically and effectually my method of propelling by the effect of the natural atmosphere; but I do not confine myself to the precise arrangements above set forth, as some may be found surperfluous in practice, or modifications of them may be desirable.

I claim the use of the flat or conical seat on the axis of my pinions, to form a valve for the admission of air, and for making an air-tight joint, in combination with my main pipe or tube, as set forth.

In witness whereof, I, the said James Pilbrow, have hereto set my hand and seal this third day of April, 1845.

JAMES PILBROW.

No. 4125.

What I claim as my invention, and desire to secure by letters patent, is the combination of a water-wheel, which rises and falls with the current or tide, with an endless chain and pulleys, in the manner and for the purpose above specified.

R. C. GRANT.

No. 4126.

Having thus fully described the nature of my improvement in re-action water-wheels, what I claim therein as new, and desire to secure by letters patent, is the manner of forming one side of the water ways and issues of such wheels so that they shall yield and increase the width of the issue, for the purpose and in the manner herein set forth.

JOSHUA EVERED.

No. 4127.

What I claim as my invention, and desire to secure by letters patent, is the loose points upon the upper side of the share, being connected to the

share by means of a dovetail, or other analogous device; I also claim the invention of a plough having one or more points between the forward point and the back end of the cutting part of the share, whether cast fast to the share or loose, as per drawings annexed, substantially in the manner and for the purposes set forth.

WM. BULLOCK.

No. 4128.

Having thus fully described the nature of my improvement in the re-action water-wheel, what I claim therein as new, and desire to secure by letters patent, is the delivering of the water from a penstock or trunk, into the issues or buckets, a re-action wheel that revolves vertically at the lower part only of said wheel, by forming the opening from such penstock or trunk so that it shall enter such wheel at its lower part only, in the manner and for the purpose set forth, by which construction and arrangement I am enabled to give any desired diameter to such re-action wheels.

ABNER CHAPMAN.

No. 4129.

Having thus pointed out the characteristics or principles of my invention, and the manner of making and using the same, what I claim as my invention, and desire to secure by letters patent, is the arrangement of the various passages leading to the hive, and in combination therewith the chambers with honey-combs, surrounding the passages, for the purpose, as fully expressed above, of preventing the entrance and detaining the miller, moth-worm, and other insects, as herein fully described; and I also claim, in combination with the passages and the chamber, the additional moth or insect trap, situated relatively to the entrance passages, as herein described.

ABRAHAM DECKER.

No. 4130.

Having thus fully described my method of forming matrices for casting the face of printers' type, and other articles therein, what I claim as new, and desire to secure by letters patent, is the manner of forming the same by means of a common type or cut, and a metallic plate with an opening, with slanting sides, the two arranged and prepared in the manner herein described, and placed in a solution of sulphate of copper, and connected with the pole of a galvanic battery, in the same manner usually practised in electrotyping; and after receiving a sufficient deposite of copper, to be fitted up for use, in the manner herein set forth.

THOMAS W. STARR.

No. 4131.

What I claim as my invention, and desire to secure by letters patent, is the combination of a valve with artificial nipples, as herein set forth.

ELIJAH PRATT.

No. 4132.

What I claim as my invention, and desire to secure by letters patent, is the manner or method of cementing or welding tortoise or turtle shell in the shape or form of keyed bugles, by winding with cord or twine, and steaming it, and making keyed bugles from that article, as before described.

GEO. W. SHAW.

No. 4133.

Having thus described my improvements in hot-air furnaces, I shall state my claims, as follows:

I do not claim simply making the top of the fire chamber dome-formed, nor do I claim the combination of an outer and inner hot air chamber; but what I do claim as my invention, is connecting the cylinder of the fire chamber with the central hot-air chamber, by means of a dome-formed top, and discharging the hot air through the middle thereof, whereby the air of the inner and outer chambers is more effectually brought into contact with heated surfaces than in any other arrangement heretofore known.

I also claim making the cast-iron top plate of the ash pit, with cells filled with non conducting substances, for the bottom of the fire-pot to rest on, and thus prevent the said plate beyond these cells, where it forms the bottom of the air chamber or chambers which surround the fire-pot, from being cracked by the heat, which would otherwise be conducted from the fire-pot to this plate, as described.

In testimony that the foregoing is a true description of my said invention and improvement, I have hereto set my signature this first day of August, in the year eighteen hundred and forty-four.

GARDNER CHILSON.

No. 4134.

Having thus fully described the manner in which I construct my abdominal supporter, for the cure or relief of *prolapsus uteri*, what I claim therein as new, and desire to secure by letters patent, is the combining with the hypogastric or abdominal pad a spring lever, such as is shown at B B, in the accompanying drawing, in such manner as that it may be used to increase or diminish the pressure on the lower part of said pad, by an arrangement substantially the same with that herein fully made known.

EPHRAIM COLVIN.

No. 4135.

We do not claim to have invented any of the parts herein described, as all are already in use, and well known; neither in our arrangements, as above described, do we claim to have obtained any results not contemplated or sought for by others, our claim being only for obtaining an increase of equality in the performance of watches, chronometers, and other timepieces, first, by the mode we have described and shown of forming the balance rim with quarter circles, arches, or segments, each way from each end of the arm, instead of a half circle from each end in opposite directions; and, secondly, by the application of a second balance spring above, below,

or inside the single balance spring heretofore in use, substantially as the same are described and shown.

In witness whereof, we have hereunto set our hands, in the city of New York, this twenty sixth day of May, one thousand eight hundred and forty-five.

JOHN BLISS.
FRED. CREIGHTON.

No. 4136.

What I claim as my invention, and desire to secure by letters patent, is the combination of a bow of wood, to fit the neck of a horse or mule, with the mode herein described of ironing and padding the same, so as to constitute the harness, collar, and hames, all complete in one.

F. C. CURTIS.

No. 4137.

Your petitioner further represents that he claims as his invention, and desires to secure by letters patent, the following particulars and combinations:

1st. An elliptical covering in combination with the circular oven, allowing the heat to act with more uniformity on all parts of the oven, and affording the draught an opportunity to unite and pass off freely.

2d. The manner in which I have combined and arranged the valves *k* and *i*, with respect to the draught pipe L, and boiler holes, and, in combination therewith, the two division plates extending back on each side of the valves in the centre of the stove.

JEHIEL F. FARRAND.

No. 4138.

What I claim, and desire to secure by letters patent, is the contractile valves to sucking and air-tubes of nursing bottles; and also the application of artificial nipples to the same, as herein set forth.

ELIJAH PRATT.

No. 4139.

Having thus fully described the nature of my improvement in clocks or timepieces, and shown the manner in which my friction preventer operates, what I claim therein as new, and desire to secure by letters patent, is the employment of a suspension piece, arranged and operating substantially in the manner of that which I have denominated the friction preventer, for sustaining the weight of the balance wheel and its arbor, as herein fully made known.

ELI TERRY.

No. 4140.

What I claim as my invention, and desire to secure by letters patent, is the obtaining of additional heating surface, and causing a lengthened cir-

culation to the flame, smoke, and heat within an enclosure of metal or walls of a hot-air furnace, without any downward draught, by the means of a system of tubes; combined, arranged, and situated as above described.

ADRIAN JANES.

No. 4141.

I shall therefore claim the combining with the space directly beneath the orifices of discharge of the gas, and with the supply or branch tubes, an expansive chamber, so as to operate in the manner and for the purpose herein before set forth.

I also claim making the lower part of the inner cases of the burner with a bell-shaped opening or mouth, in the manner and for the purpose as above specified.

In testimony whereof, I have hereto set my signature, this twenty-third day of May, A. D. 1845.

WM. BLAKE.

No. 4142.

Having thus fully described my machine, what I claim as new, and desire to secure by letters patent, is constructing the cover of the saddle in such a way as to allow the tree to be stuffed, or covered with stuffing, by making said cover in one piece, so as not to present the projection of jockeys, or small skirts, or the ridges occasioned by draw-downs, &c.

BENJ. SUITS.

No. 4143.

What I claim as my invention is the above described improvement, or manufacture, or combination of a colored sheet of test paper and one or more plain white, or lighter, or darker, or different colored sheets or surfaces of paper, applied to one or both sides of the test sheet, substantially as above specified.

ARTHUR VARNHAM.

No. 4144.

What we claim, therefore, as our invention, and desire to secure by letters patent, is the manner herein described, in which we have arranged and combined the respective parts of the apparatus for salting or impregnating provisions with any desired solution, as set forth; that is to say, we claim the combining of a common lifting pump, and of a force pump, with the vessel and with the cistern, substantially in the manner and for the purpose herein fully made known.

DION. LARDNER.
JAS. DAVIDSON.

No. 4145.

What we claim is constructing a reflecting baker, in the form as above described; that is to say, the baker of a cylindrical form, having the grate

or shelf upon which the articles are to be cooked being placed near the centre, in the manner above described.

VALPARAISO, PORTER COUNTY, IA., *July* 23, *A. D.* 1845.

WILLIAM TAINTOR.
HARLOW S. ORTON.

No. 4146.

Having thus fully described my machine for hulling and cleaning clover seed, what I claim as new, and desire to secure by letters patent, is, first, the grooved form of the projections upon the beating cylinder, and surrounding concave, the grooves being either circular, as in figure 3, or spiral.

I also claim the manner in which the beating and perforated concaves are connected by the double apertures, and, in combination therewith, the form of the discharge aperture for the chaff; all combined, arranged, and operating substantially as herein set forth—not confining myself to the exact forms and proportions herein represented, but the general principles of the machine.

SAMUEL W. POWELL.

No. 4147.

We are aware that machines for cutting laths have been made with a carriage to carry the bolt or block against the edge of a knife, and that the bolt or block has been griped preparatory to and during the operation of cutting, in machines in which the knife is carried against the bolt, instead of the bolt against the knife, and the bolt liberated before the knife has been moved back clear of the bolt; and hence we wish it to be clearly understood that we do not claim to be the original and first inventors of these; but what we do claim as our invention, and desire to secure by letters patent, is making the carriage which carries the bolt or block to the knife in two parts, moving on each other, and connected together by a spring, or analogous device, so that the bolt is griped whilst being carried against the edge of the knife, and still griped until drawn back of the edge of the knife, and then liberated, for the purpose and in the manner substantially as herein described.

SOLOMON F. FINCH.
JAMES WHEELER.

No. 4148.

What I claim as my invention, and desire to secure by letters patent, is making the grinding teeth of mills in concentric rows, projecting from the surface of the plates, so that the teeth of one plate shall run in the spaces between the teeth on the other, and vice versa, in combination with the grooves or furrows running towards the periphery of the plates, through which the substances acted upon are carried outwards, whether these furrows be arranged radially, according to what is technically termed the eight-quarter dress, or in other manner, leading from the inner to the outer range of teeth.

And I also claim in combination with the teeth, arranged as expressed in

the above claim, the breaking teeth on a cylinder or cone, arranged substantially as herein described and for the purpose specified.

BERIAH SWIFT.

No. 4150.

What I claim as my invention, and desire to secure by letters patent, is the combination of the external textile tube with the entire India rubber tube, as above described.

HORACE H. DAY.

No. 4151.

Having thus fully described the manner in which I construct my lock, and explained the operation of the respective parts thereof, I do hereby declare that I do not claim to be the inventor of a key with an expanding bit drawn out by an eccentric, this having been before used; nor do I claim the employment of a series of tumblers or levers, which are to be raised to different heights by the key bit, these being also well known; but what I do claim as constituting my invention, and desire to secure by letters patent, is the particular manner in which I have combined and arranged certain parts of my lock, by which combination and arrangement a new and useful effect is produced; that is to say, I claim the manner in which I have combined the key, having an expanding bit, with the revolving box or drum, the latter being equal in thickness to the bit of the key, and having a key-hole through it by which it is turned with the key, in the manner and for the purpose set forth.

I claim the manner in which I have combined what I denominate the pressure tumbler, carrying the stump with the ordinary tumblers; the pressure tumbler having its fulcrum pin on the lock bolts, and the ordinary tumblers their fulcrum pin attached to the box of the lock, and also having their fore-ends provided with projecting teeth, for the stump to act upon, in the manner and under the conditions set forth; the whole arrangement and operation being substantially the same with those herein described.

ANGUS McKINNON.

No. 4152.

Having thus fully described the nature of my improvements, in the manner of constructing cooking stoves, what I claim as new therein, and desire to secure by letters patent, is, first, the manner in which I arrange and combine my dampers, so as to close the opening for the admission of heated air to the cavity in the oven door, and to be opened by the closing of said door, as set forth.

Secondly, I claim the manner of arranging and combining the semi-cylindrical dampers with the flue spaces of the stove, for the purpose and substantially in the manner herein made known.

HOSEA HUNTLY.

No. 4153.

Having thus fully described my improvement, what I claim as my in-

vention, and desire to secure by letters patent, is the combination of the inclined plane with the washer or piston, constructed and arranged in the manner and for the purpose set forth.

HARVY W. SABIN.

No. 4154.

Having thus fully described the nature of my improvement in the lamp for burning lard and other fatty substances, what I claim therein as new, and desire to secure by letters patent, is the employment of a wick receiver, which is attached to the lower end of the wick tube or tubes, for the purpose of containing a length of wick that may be coild up therein, in the manner and with the intention herein made known.

ANDREW KAYSER.

No. 4155.

What I claim as my invention, and desire to secure by letters patent, is the connecting of the claw to the handle, as above described, with the loop at the end for the handle to pass through.

SOLOMON ANDERSON.

No. 4156.

Having thus fully described the nature of my improvement in the eccentric revolving pivot chain, what I claim as new is the placing of the pivot or pin upon which the seat revolves at an equal distance from the two sides of the seat, and at two-fifths (or nearly so) of that distance from the back of the chair, as set forth, or at a point so near to that distance as shall be substantially the same in the result of its action.

JORDAN L. MOTT.

No. 4157.

What I claim as my invention, discovery, art, or improvement, and desire to secure by letters patent, is the art or process of separating the impurities contained in salt water or brine, in its crude state, by adding a sufficient quantity of common salt to the salt water taken from the salt springs, wells, or other source, in its crude state; when properly mixed and dissolved, to bring the brine in the vats or cisterns to immediate saturation, for the express purpose of precipitating the impurities and depositing them in the bottom of the vats or cisterns, without the aid of evaporation or of solar or artificial heat. I do not claim adding salt to salt water, for the purpose of concentrating, as is frequently done; but I do claim the process, above described, of separating the impurities from salt water by the addition of salt thereto, allowing the impurities sufficient time to settle, and the drawing off for evaporation. Dated August 11, 1845.

NEHEMIAH P. STANTON.

No. 4158.

Having thus fully described the characteristics of my invention, and the

manner of making and using the same, I wish it to be distinctly understood that I do not make claim to the employment of a series of wheels having the same axis of motion when the sections of the shafts are separated from each other by a permanent sleeve, when the arrangement of the wheels is such as to cause the sections of the shaft to turn in reverse directions, as these are well known and do not attain the end contemplated by me, and pointed out above; nor do I claim simply oiling a journal through a perforation in the shaft, as this has long since been known; but what I do claim as my invention, and desire to secure by letters patent, is the arrangement of two sets of cog or belt wheels, and pinions connected therewith, each set consisting of not less than two wheels, with their appropriate pinions, on two shafts made in sections turning on each other, and in the same direction, for the purpose of avoiding friction, and rendering the machinery compact, as herein described.

And I also claim, in combination with the arrangement of shafts herein described, the oil passages, whereby the oil applied at two places is conducted to all the rubbing surfaces of the series of shafts and bearings, as herein described.

JAMES LEFFEL.

No. 4159.

What we claim as our invention, and desire to secure by letters patent, is the construction of a diving or descending flue at the end of the fire-box, communicating with the flue beneath an oven, placed immediately behind and upon a level with the fire box, or nearly so.

FRANCIS S. LOW.
JOHN S. LEAKE.

No. 4160.

What I claim as my invention, and desire to secure by letters patent, is the employment of an elastic metal tool for cutting and turning off, and shaping the periphery or sides of grindstones, as above described, in any form or manner substantially as herein described, in which an elastic metal tool may be applied to that use.

CHARLES ARTHUR.

No. 4161.

I claim the afore-specified combination of ingredients, whether in the proportions set forth, or in any other which may, under any circumstances, be found better applicable for the purpose intended.

In testimony whereof, I have hereto set my signature this eighteenth day of June, A. D. 1845.

SOLOMON GUESS.

No. 4162.

What we claim is the manner in which we construct the wash board, so as to effect a partial vacuum within its lower portion by centrifugal action, in the manner and for the purpose above described.

T. C. BENTON.
H. W. ZIMMERMAN.

No. 4163.

What I claim as my invention, and desire to secure by letters patent, is the apparatus for the lasting boots by the compound instep and shank draught, as herein above substantially described and set forth, by means of the above described machine, or any other substantially the same.

DAVID HARRINGTON.

No. 4164.

Having thus fully described my improvements, what I claim therein as my invention, and for which I claim letters patent, is the combination and arrangement of the springs, and the manner in which they are applied to the sliding board, and the rollers attached to the same, the use of which has heretofore been shown.

Lastly, I claim the mode of arranging the springs and handle for the purpose of relieving the standards on one side, as above made known, by coiling the springs around the arm that connects the handle with the standards, so that as the handle is raised above the top of the box to draw back the standards, the spring is relieved.

HORATIO HOSKINS.

No. 4165.

What I claim as my invention, and desire to secure by letters patent, is the combination of the arched jaws and curved spring, connecting bars, screw rod, and lever, arranged and operated in the manner and for the purpose set forth.

JOHN YOUNG.

No. 4166.

What I claim as my invention, and not before known, in the above described swing, and desire to secure by letters patent, is the application and use of springs in combination with the connecting rods, and in the construction of a swing, so that persons exercising thereon may receive the motion of a spring, in combination with the ordinary swing motion; and the manner of giving motion to the swing by means of the cord and pulley, or cords and pulleys, in combination with the swinging and stationary frames, as herein described.

JOEL H. ROSS.

No. 4167.

I do not claim as my invention the construction of galvanic rings of any description: what I do claim as my improvement, and desire to secure by letters patent, is simply making the galvanic rings, bands, &c., elastic, in the mode described.

DAVID C. MOORHEAD.

No. 4168.

What I claim as my invention, and which I desire to secure by letters patent, is the mode of preventing the moth from entering the hive, and entrapping her by means of the upright metallic tubes and inverted truncated cones forming the entrance to the reception room of the hive, and the upright tube forming a passage between the chamber and lower box, all of said tubes being surrounded by inverted truncated cones, and containing water, and into which the moth is caused to fall, as described.

I also claim combining with the vertical tube a spiral rest upon which the bees cluster, in the manner and for the purpose set forth.

ISRAEL LAMBORN.

No. 4169.

What I claim as my invention is the combination of the cylinder, included conical sieve, and fan, substantially as herein described, and for the purpose of cleaning grain.

And I also claim the combination of the cylinder, included cylindrical screen and fan-blower, substantially as described ; and also the combination of the cylindrical screen, conical sieve, fan blower, and cylinder, for the purpose and in the manner described above.

ANTHONY COOLEY.

No. 4170.

What I claim as my invention, and desire to secure by letters patent, is the manner of securing the cultivator beam to one of the cross-pieces of the handles or standards, (upon which it turns,) in combination with the manner of fastening and screwing the same to each other, and regulating the angle of inclination of the handles and cultivating points, and the position of the beam, by means of the adjusting braces and nuts, constructed and operating substantially in the manner and for the purpose herein set forth, and represented in the different modifications of my new and improved shovel-pointed cultivator.

ALMOND HARRISON.

No. 4171.

What I claim as my invention, and desire to secure by letters patent, is the attachment to the rear of the plough of the adjustable hinged shoe, guiding cutter attached thereto, and adjusting brace ; all combined and operating substantially in the manner and for the purpose herein set forth.

I also claim the attachment to the plough standards and shafts of the lateral adjusting braces, substantially in the manner and for the purpose herein set forth.

ANDREW RALSTON.

No. 4172.

Having thus fully described the nature of my machine for breaking coal, and shown the manner in which the same operates, what I claim therein

as new, and desire to secure by letters patent, is the manner, herein made known, in which I form and combine the bars, and the wheels working between them; the bars having the cutters projecting out laterally from them, and the wheels carrying the cutters on their peripheries.

I do not make any claim to the manner of gearing this apparatus, nor do I intend to limit myself to the particular mode of so doing, herein described, but to vary this, as well as the form of other parts, as I may deem proper, whilst I attain the same end by means substantially the same.

WM. RICHARDSON.

No. 4173.

What I claim as my invention, and desire to secure by letters patent, is combining a saddle, or other suitable seat and spring, with handles, the whole being mounted on a suitable frame, substantially in the manner described.

JAMES ELLIOTT.

No. 4174.

I am aware that slides have been applied to pen and pencil holders, for various purposes, as also projections to receive the ends of the writer's fingers, to protect them from the ink; and therefore I do not claim simply the application of spring slides or projections for the reception and protection of the fingers, as of my invention; but what I do claim therein as new, and desire to secure by letters patent, is the combining therewith a projecting piece, ring, or guard, which shall extend out from the holder sufficiently far to act as a guard in preventing the pen from passing too deep into the ink-holder, such ring or guard being attached to a spring sliding within the body of the pen-holder, to afford the ready means of strengthening the spring and for adjustment, substantially in the manner herein described.

It will be seen, that although the sliding part of my pen-holder bears some resemblance to the slide of a pencil-case and of some other instruments, its object and arrangement differ entirely from those of such slides, in its constituting a projecting guard, intended for a new and definite purpose.

DANIEL HARRINGTON.

No. 4175.

What I claim as my invention, and desire to secure by letters patent, is combining the two bolts by means of the dog or lever, so that when the inside bolt has been locked, the outside one cannot be locked, as described.

GEO. OATES.

No. 4176.

The improvements embraced in this new instrument, and for which I ask letters patent, are the method of combining the pieces of copper and zinc into an instrument, said pieces being insulated from each other, and having liberty to rock, so as to touch together, by being moved to the right or left, and thereby produce a galvanic shock: while they are so affected they

produce mechanical action—all as above described; by which a much greater (see above) number of shocks are experienced in a given time, than the ordinary instrument, in any of its forms, can be made to do, and thereby furnishing a large *increase* of curative or medicinal power. The above named improvements, it will be seen, are three-fold. There is also one other improvement embraced in this instrument, which is important to such invalids as are feeble in the strength of their fingers, which is a usual thing with emaciated females; the shocks produced by moving the turned-up end to the right or left can be accomplished with the least possible exertion of the hand, or thumb and finger.

It is my intention to vary the construction of the newly improved galvanic electric instrument, so as to adapt it to the requisitions of the various cavities of the human system, and the wants of invalids of all descriptions, still preserving and embracing its general principles, features, and improvements, as above described and claimed; and I do hereby declare that it is *not* my intention to claim anything *herein* that is embraced in my former letters patent.

DANIEL HARRINGTON.

No. 4177.

I do not claim as my invention the employment of a steam or other boat for assisting in saving or partially saving wrecks or other cargoes, as this has before been done; but what I do claim as my invention, and desire to secure by letters patent, is the employment of a caisson made of water-proof cloth, or other suitable material, rendered water-proof, or partly so, to enclose a wrecked vessel, for the purpose of excluding the surrounding water whilst pumping from the inside of the wreck and caisson, as herein described.

I also claim as my invention the employment of the movable frame or platform, in combination with the flexible caisson and wreck, for the purpose and in the manner described; and, finally, I claim connecting a pump, or pumps, with the caisson, and a steam engine or other first mover on board a boat, by means of the swinging crane, in combination with the universal joints, as herein described, to admit of the free movement of the boat or caisson, without affecting the connexions, as herein described.

PHINEAS BENNET.

No. 4178.

Having thus fully described the nature of my improvements in the manner of employing expanding bars or rods for preventing explosions and economizing fuel, what I claim as new therein, and desire to secure by letters patent, is the combining with a steam boiler of two such bars of brass or other suitable metal, arranged as herein described; said bars being also combined with each other, and with the apparatus by which the damper in the chimney is to be closed, and the draught through the furnace arrested, the same being effected substantially in the manner herein set forth. I do not intend, however, by this claim, to limit myself to the precise arrangement of the respective parts of my apparatus, as herein described, but to vary them as I may think proper, whilst I attain the same end by means substantially the same.

I do not claim the exclusive right to use expansion rods or bars to open or close valves or dampers, by variations of temperature, this principle for obtaining motion for such a purpose being well known; but I limit my claim to the foregoing improved arrangement and combination of parts for effecting this object.

JAS. MONTGOMERY.

No. 4179.

Having thus fully described the nature of my improvement in the manner of driving the bobbins, spindles, and flyers of a throstle, for the spinning of cotton or other fibrous substances, what I claim therein as new, and desire to secure by letters patent, is the giving motion to such bobbins, spindles, and flyers, by means of a horizontal friction-wheel, bevelled on its upper edge, so as to adapt it to the lower ends of the flanches of the bobbins, or some analogous device on the spindles, which are also duly bevelled; by which means I am enabled to give them the requisite motion, and to dispense with the use of bands for that purpose.

I do not claim to be the inventor of the method of communicating a revolving motion from one body to another, by means of friction, this having been frequently done in machinery of various kinds; but I do claim the manner of applying this principle to the driving of the bobbins or spindles of a throstle, or other similar spinning machine, under an arrangement of the respective parts, and for the purpose herein fully made known; by means of which arrangement and combination the use of bands is dispensed with, and the motion is more advantageously communicated than in the ordinary mode, whilst the revolving and traversing motions necessary to the winding up of the yarn upon the spools are given thereto.

BENJAMIN BRUNDRED.

No. 4180.

What I claim as my invention, (jointly with the late William Avery,) and which I desire to secure by letters patent, is the before described construction of the jaws for griping and raising the drill, in combination with the drill and winding ways for turning it, and the manner of closing the jaws by means of the aforesaid combination of the arm *u*, axle *c*, arm *g*, rod *h*, lever and cam, or any other combination substantially the same, for a similar purpose.

HIRAM H. SCOVILLE.

No. 4181.

Now I do not claim, as my invention, the application to purposes of propulsion of spiral blades, radiating from and fastened to a centre block or hub, letters patent for the same having been issued, in the United States, to Benjamin M. Smith, in 1829; but I claim as my invention, and desire to secure by letters patent, the hub, constructed with the perforated projections, and the combination of the same with the elliptic braces, for the purpose of sustaining and strengthening the spiral propeller blades, as herein before described.

J. ERICSSON.

No. 4182.

Having thus described the chief characteristics of my engine, the manner of constructing, arranging, and operating the parts, I wish it to be distinctly understood that I do not claim as my invention working the piston of a rotary engine in an annular groove or bent cylinder, nor do I claim admitting steam through a hollow shaft and passages made in the disk to which the piston is attached, nor elastic metal ring packing; but what I do claim, and desire to secure by letters patent, is—

1st. Making the annular or bent cylinder in two parts, divided by a plane parallel with the shaft of the engine, instead of at right-angles thereto, for the purpose and in the manner fully described.

2d. The arrangement of the elongated steam and exhaust passages in the disk to which the piston is attached, when combined with the arrangement of the valves and the periods of their motions, so as to cause them to establish an equilibrium (or nearly so) of the pressure above and below the valves, prior to and during their motions, substantially as described.

3d. The arrangement of the steam and exhaust passages in the disk in combination with the shifting valve governing the aperture in the tubular shaft, and the annular groove in the packing plate, for the purpose and in the manner described.

4th. Grooving the faces of the disk and packing plates, to admit steam to the rubbing surfaces, for the purpose of fabricating them, as described.

5th. Making the outer or rubbing surface of the piston of a single open-spring metallic hoop, in combination with the hempen or other packing within, and the mode of retaining the hoop by fitting it over the fillet projecting from the flanch that forms the connexion with the disk, which junction is rendered steam-tight by means of the inner packing, as described.

And, lastly, connecting the piston to a flanch projecting from the disk on the shaft, by means of screws passing through the enlarged apertures in the flanch, to admit of the free play of the piston, to adapt itself to the cylinder in case of inaccuracy, as described.

WILLIAM WRIGHT.

No. 4183.

Having thus described my invention, I shall claim the combination with the clay or mortar hopper, or reservoir, and one or both its chambers, discharging vents, or false moulds and pistons, of the reciprocating slide arranged within the hopper and upon its bottom, and operating to supply the end chambers and vents with mortar or clay, substantially as above described.

In testimony whereof, I have hereto set my signature this seventh day of June, A. D. 1845.

WILLIAM SANFORD.

No. 4184.

Having thus fully described the nature of my improvement in the manner of communicating heat to the ovens of cooking stoves, I do hereby declare that I do not claim any improvement in the general construction of stoves, my improvement in the lower oven flue being equally applicable

to stoves in a variety of forms; but what I do claim as my invention, and desire to secure by letters patent, is the forming of the bottom plate of the oven with a number of tubes or boxes, usually of sheet iron or other substance, thinner than the bottom plate, that descend from it through the lower flue space; the same being effected under an arrangement of their respective parts substantially the same with that herein described, and for the purpose set forth.

C. J. WOOLSON.

No. 4185.

Having thus described my improvement in "extension tables," I shall state my claim as follows: What I claim as my invention, and desire to have secured to me by letters patent, is the making or arranging either semicircular part of the top of said tables so as to be capable of a horizontal adjustment, substantially as herein above described, and for the purpose set forth.

In testimony that the foregoing is a true description of my said invention and improvement, I have hereto set my signature this twenty-ninth day of May, in the year eighteen hundred and forty-five.

CORNELIUS BRIGGS.

No. 4186.

What I claim as my invention, and desire to secure by letters patent, is the manner of connecting the right and left hand ploughs to the beam by means of the cap piece, the bolt, oblong opening, self-acting spring latch, and notches, all combined and operating substantially in the manner and for the purpose herein set forth.

I also claim the combination of the detaching cord, latch, spring, cap piece, and notches, arranged and operating substantially as herein set forth.

JOSEPH TRUMP.

No. 4187.

I do not claim as my invention simply griping the sheet of metal between the face of a stock and the bed, as this has heretofore been done; but what I do claim as my invention, and desire to secure by letters patent, is, first, making the folding plate to project from and on top of the stocks to which it is attached, or of which it makes part, arranged in combination with the bed of the machine and the folder, in the manner herein described, by means of which the edge of the sheet metal is griped and folded entirely over, substantially as herein described; and I also claim, in combination with this arrangement, the manner of preventing the folding-bed and folding plate from springing in the middle of the length, by means of the bolt, with its imbedded journal head, substantially as herein described.

HENRY A. ROE.

No. 4188.

What I claim as my invention, and desire to secure by letters patent, is the manner in which I have combined the coal fire chamber with the wood-fire chamber, by placing the grate of the coal chamber partly within the

top of the wood chamber, and in combination therewith the fluted form of the coal-fire chamber, to admit a draught from the wood fire to pass through the coal chamber, as herein fully expressed.

BENJAMIN T. RONEY.

No. 4189.

And having now described the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is, first, the application of ammoniacal salts, in the manner before described, to prevent and remove incrustration in the steam boilers and steam generators; and, secondly, the use of ammoniacal salts in *conjunction* with muriatic, acetic, or nitric acid, for the purpose of removing old incrustation, in the manner above described.

L. A. RITTERBANDT.

No. 4190.

What I claim as my invention, and which I desire to secure by letters patent, is the mode of regulating the speed of the mill by means of the fixed and movable rudders, roller, cord, and weight, in combination with the circular platform to which they are attached, containing the wind wheel and axle, and resting on friction rollers, in the manner set forth.

GEORGE PARKER.

No. 4191.

Having thus fully described the manner in which I construct my parlour grate, and arrange the respective parts thereof, what I claim therein as new, and desire to secure by letters patent, is the manner in which I have arranged the partitions and damper in the box, or heated air space, and combined them with the heated air tubes or flues, at each end of the grate, for the purpose set forth. I claim the forming of the jambs of the grate with open work offsets, in combination with the particular arrangements and provision made for setting the same, so as to constitute an air-heating chamber in the rear thereof, as described.

I do not make any claim to the forming of an air heated chamber at the back of a grate, but limit my claim to the particular manner, herein made known, of arranging the same, in connexion with the wall that receives the plate and the escape-pipe.

JAMES WILSON.

No. 4192.

What I claim as my invention, and desire to secure by letters patent, is the method of making the dyestuff or carasene from spent madder, by the chemical action of water, sulphuric acid, and an alkali, as described above.

FREDERICK PFANNER.

No. 4193.

I do not claim merely covering the wings of the propeller in such a manner that a section perpendicular to the shaft would produce a curved line,

nor do I claim making the wings approximating to the form of a conical surface; but what I do claim as my invention, and desire to secure by letters patent, is making the wings of the propeller in the precise form of such a portion of the convex surface of a regular cone as would be cut out by a plane or planes passing through its axis, and comprehending about half of its surface, each wing being attached along one of its straight edges, to the shaft.

L. PHLEGER.

No. 4194.

Having thus fully described the nature of our improved apparatus for enlarging or forming chambers within the openings made by boring the earth or rocks, what we claim therein as new, and desire to secure by letters patent, is the manner of constructing an instrument such as is herein described and represented, in which expanding cutters are so combined with a tubular shaft as that they may be received within it, and be made to open out by an arrangement of parts constructed for that purpose, and substantially in the manner herein set forth.

THOMAS S. SPEAKMAN.
RICHARD A. STRATTON.

No. 4195.

In conclusion, I claim the combination of the chisel carriage with a separate carriage, arranged to operate in the manner and for the purpose above specified.

Also, the combination of the slide cam on the chisel holder, arms, and straps; the whole being applied to the chisel holder, its carriage, and the carriage A, and operating substantially in the manner and for the purpose as hereinbefore described.

In testimony whereof, I have hereto set my signature, this twenty-third day of January, A. D. 1845.

CHARLES BENNET.

No. 4196.

I claim as my invention, and ask a patent for, a cotton gin brush, made of a cylindrical form, with holes or openings as above described, or made with pieces of lagging with open spaces between them, as above described; also, with openings at the ends about the axis of the shaft, as above described, and with heads, the outer ones having each a hoop, circular projection, or other equivalent contrivance, for cutting off currents and eddies of air, as above described.

I also claim as my invention, and ask a patent for, the hoop, circular projection, or other equivalent contrivance, at the head of the brush, for cutting off currents and eddies of air, as above described, with an opening within the hoop or circular projection for the admission of air, as above described.

EDWIN KEITH.

No. 4197.

What I claim as my invention, and desire to secure by letters patent, is

the arrangement of the dumb flues surrounding and within the oven, in the manner and for the purpose set forth.

PETER J. CLUTE.

No. 4198.

What I claim and desire to secure by letters patent, is, 1st, the *gate* and *agitator;* the bars of the latter working with freedom between the bars of the former in such a manner as to free the coal of ashes, so as to insure active combination.

2d. Also the arrangement of the collars, containing a number of holes in combination with the combustion cylinder and zigzag smoke pipes, for the purpose of preventing the too rapid escape of air into the apartment next above before it is sufficiently heated.

3d. Likewise the arrangement of plate B, in combination with the combustion cylinder and smoke pipes, as described.

4th. And also the arrangement of plate C, containing the register for regulating the draught through the coal, in combination with the register and smoke pipes and combustion cylinder.

H. L. B. LEWIS.

No. 4199.

What I claim as my invention, and desire to secure by letters patent, is connecting a crank pin with two cranks, by means of turning and sliding joints combined, whether the pin be made to slide in both cranks or only in one, so as to equalize the strain of the engine on each crank, and allow them to move and compensate for any error in the relative position of the crank shafts, as herein described.

FREDERICK ELSWORTH SICKELS.

No. 4200.

I do not claim to have invented any of the parts herein described and shown, except as follows:

I claim as new and of my own invention, and desire to secure by letters patent, the application of the movable hanging stile, hinged in a rebate in the doors or sash stile, and steadied in a groove in the jam by screws, either without or in combination with the springs H and K, and roller I, and inclusive of any variations arising from the nature of the particular case, when such application and combination, or variations, for the purposes herein described, are substantially the same in construction and practical effect, and shall be used in hanging or mounting French sashes, casement windows, or folding doors, of any description and for any purpose.

In witness whereof, I have hereunto set my hand in the city of New York, this sixth day of June, in the year one thousand eight hundred and forty-four.

AARON B. CARPENTER.

No. 4201.

What I claim as my invention, and desire to secure by letters patent, is

tripping the drop-valve of the cut off by a motion independent of the lifters, substantially in the manner and for the purpose herein described.

I also claim combining the wiper that drops the valve of the cut-off, whether working horizontally or vertically, with any of the moving parts of the engine other than the lifters, on their rocking shaft, by means of the sector and arm or arms, by means of which the extent of the cut off can be regulated at pleasure during the action of the engine from the full to the least portion of the stroke, as herein described.

FREDERICK ELSWORTH SICKELS.

No. 4202.

I do not claim letters patent simply for casting the steam chests with the cylinder, or with the cylinder bottom and condenser; but what I do claim as my invention, and desire to secure by letters patent, is casting the steam chests with the cylinder, or one with the cylinder and the other with the cylinder bottom and condenser, by making the side of the steam chest the side of the cylinder or condenser, in combination with the manner of fitting the cylinder head and the lower end of the cylinder to the chests, and the mode of making the attachments without the continuation of the flanches, thus dispensing with the nozles and nozle flanches, and their attachments, and saving at each stroke the steam contained in the nozles, all as herein described.

FREDERICK ELSWORTH SICKELS.

No. 4203.

Having thus fully described my improvements, what I claim as my invention, and desire to secure by letters patent, is constructing the receiver, (figs. 3 and 4,) in the manner and for the purpose described, viz: by supporting its edges with springs, as set forth.

NELSON BARTLETT.

No. 4204.

What I claim as my invention, and desire to secure by letters patent, is giving to the spiral or twisted knife or cutter, attached to a flanch in a line radiating (or nearly so) from the axis of the stock, a traversing motion in the direction of its axis, in combination with a reciprocating rotary motion on its axis, when this latter motion is governed by the twisted plane of the cutter, or any thing essentially the same, to enable the grinder to give the required level to the ground face, and the proper line to the edge, substantially in the manner herein described.

WILLIAM HOVEY.

No. 4205.

What I claim as new, and as constituting my invention, and desire to secure by letters patent, is the forming or dividing of the upper part of the chimney into two or more curved and divergent branches or flues, with the inner walls of each formed in part or wholly of perforated sheet iron, upon the principle and for the purpose hereinbefore set forth.

I also claim the combination of the tubes or radial branches with the exterior case or jacket, forming as it does a chamber around and below them.

WM. C. GRIMES.

No. 4206.

What I claim as my invention, and desire to secure by letters patent, is, first, the combination of the griping bars, bent levers, and inclined planes, for griping the block for cutting the lath, as herein set forth.

Second, the combination of the "self-clearers" with the rest and knife, as herein described.

Third, the counting apparatus, constructed substantially as herein described, in combination with the lath-cutting machine.

SAMUEL CHENEY.

No. 4207.

What I claim as my invention, and desire to secure by letters patent, is the particular manner of constructing the dining-table to be heated with pure hot air, introduced by means of pipes from a furnace, as above described.

H. L. B. LEWIS.

No. 4208.

And, having thus fully explained the character of my invention, the essential modes of application, and the manner of making and using the same, what I claim as my invention, and as distinguished from all other things before known, is—first, making primers of fulminating mixtures, or such compounds as ignite by percussion in a continuous series, each primer, or any two or greater number, being separated from the others by a substance which is more or less combustible than the fulminating mixture, by which one or more may be exploded without communicating fire to the others.

Secondly, the mode herein described of moving and measuring out the primers, by the movement of the lock, substantially as described.

EDWARD MAYNARD.

No. 4209.

What I claim as my invention, and desire to secure by letters patent, is the before described construction of the knife; that is to say, making it with a series of sharp cutting edges, commencing near the top of the blade, on each side, and gradually downward and inward towards the centre, forming a serrated concave edge on both sides, each cutting edge being made in horizontal and parallel lines, the lower point being made sharp so as to pierce the article to be cut first, and each succeeding knife following in its turn and cutting the article.

GREY UTLEY.

No. 4210.

What I claim as my invention, and desire to secure by letters patent, is the confining the thin metallic reed, used in the above named instruments, to a sliding plate, and securing the said metallic reed and sliding plate in a case, so that the pitch of the reed may be raised or lowered by the turning of a screw attached to the sliding plate, substantially in the manner and for the purpose herein described and set forth.

CHAS. HORST.

No. 4211.

Having thus described my invention, I shall claim the above mode of guiding the saws, the same being effected by the curved slots of the pattern plates and blocks through which the saw works, in combination with vibrating arms applied to the saw frame and saw, as set forth, the whole being substantially as herein before explained.

In testimony whereof, I have hereto set my signature this second day of August, A. D. 1845.

FREDERICK W. HARRIS.

No. 4212.

What we claim as our invention, and desire to secure by letters patent, is the method above described, by turning the tongues or reeds of accordeons or seraphinas, and other instruments deriving their tones from the vibration of metallic reeds, by means of movable clamps, which gripe the reeds, and embrace a part of the plate to which the reeds are attached, and admit of sliding or moving to increase or decrease the length of the vibrating part of the reed, and thus regulate the tone, as herein described.

MARTIN SCHNEIDER.
NIKLAUS SCHNEIDER.

No. 4213.

What I claim as my invention, and desire to secure by letters patent, is the method of removing and putting in the driving and truck-wheels of locomotive and other railroad carriages, by the employment of a vertically moving platform for letting down and raising up the wheels, in combination with the permanent railway and trussel, or other support for the locomotive or car frame, substantially as herein described.

THOMAS D. SIMPSON.

No. 4214.

I do not claim simply the employment of a reverberator in a stove or fireplace, as this has heretofore been done, but for a different purpose and in a different manner; and, therefore, what I claim as my improvement, and desire to secure by letters patent, is the combination of a flange or "reverberator" with the hood or muzzle of a stove, under the eduction pipe or aperture, and projecting in front thereof, and inclining downwards,

whether of a greater or less width, or set at a greater or less angle, substantially in the manner and for the purpose set forth.

JAMES PEDDER.

No. 4215.

I do not claim as my invention making the warves of spindles, flyers, or tubes for carrying bobbins or spools, with flanches, nor the driving of them by a belt; nor do I claim driving spindles, flyers, bobbins, or spools, &c., by resting them on a belt, as all these devices and methods have been known and used before, but not as I have applied them; and, therefore, what I claim as my invention, and desire to secure by letters patent, is driving spindles, flyers, bobbins, or spools, &c., by means of a belt with parallel edges equal (or nearly so) in width to the space between the flanches of the warves, and passing between them when these warves are so arranged as to be suspended thereon, without the belt bearing against their peripheries, for the purpose and in the manner substantially as herein described.

WM. BAXTER.

No. 4216.

What I claim as my invention, and desire to secure by letters patent, is the combination of a sheaf box with the platform into which the grain is thrown before being deposited upon the ground from the platform.

FERDINAND WOODWARD.

No. 4217.

What I claim as my invention, and desire to secure by letters patent, is the arrangement of the series of tubes around the chimney, with their imperforated surfaces towards the centre of the chimney, to prevent the direct action of the exhaust, &c., from forcing the sparks through the perforations, as herein described.

I also claim the arrangement of the damper, or valve, with the inverted concave plate and cone at bottom, in combination with the series of tubes composed of perforated and imperforated surfaces.

I also claim, in combination with the series of tubes surrounding the chimney, the tubes attached to the outer casing, or the equivalents thereof, for conducting the sparks into the receptacle, that are carried by the force of the current up to the top, as herein described.

And, finally, I claim connecting the fire-chamber with the receptacle for the sparks, made in the lower part of the smoke-box, by a partition therein, by means of a lower tube or range of tubes corresponding with the flue-tubes, so as to carry back the sparks to the fire chamber by an arrangement entirely within the casing of the boiler and furnace, and acted upon by the current, as herein described.

WILLIAM DUFF.

No. 4218.

What I claim as my invention, and desire to secure by letters patent, is—

1st. The combination of the slide-rest, guided in the manner set forth,

with the tool for turning off the cask, constructed and arranged in the manner set forth.

2d. I also claim the apparatus for chamfering, and howelling, and crozing; that is to say, the combination of the cylinder, open at both ends, so that both ends of the cask can be worked off without changing—with the chucks for fastening the cask into the cylinder, and with the tools, as herein described, for chamfering and howelling.

3d. I also claim the crozing-tool, with the changeable face-plate, as herein set forth.

4th. I likewise claim the combination of the stock, cutter, adjustable and gauge-plate, constituting the tool for turning and smoothing the outside of the cask, as above described, and represented in fig. 4.

5th. I likewise claim the peculiar construction of the tool for howelling the cask, as above described, and represented in fig. 9.

6th. I likewise claim the peculiar construction of the tool for chamfering the ends of the cask, as above described, and represented in fig. 8.

WM. TRAPP, Jr.

No. 4219.

What I claim as my invention, and desire to secure by letters patent, is the combination of a series of pairs of cylinders, each pair having spiral-formed slats or bars on them, the slats in each pair running in contrary directions from that immediately preceding, so as to break the hemp in several directions, as herein set forth.

I also claim, in combination with the dressing-cylinder or cylinders, the vibrating motion of the feeding rollers, so as to draw the hemp in and out again, as before described.

BENJAMIN M. SMITH.

No. 4220.

What I claim as my invention, and desire to secure by letters patent, is moulding or casting the socket on a screw-former, which can be withdrawn from the glass after it has solidified, and before it contracts sufficiently, by cooling, to split or crack, as described.

GEO. O. RUSSELL.

No. 4221.

What I claim as my invention in the above described improvement, and desire to secure by letters patent, is the application of an air-inclined valve or clapper, having a surface of glass or other hard, smooth material, in combination with said inclined valve and ink-tube; which valve is forced upwards by means of springs, or otherwise, upon the bottom of the ink-tube, and arranged substantially in the manner and for the purposes above set forth and described.

WALTER HUNT.

New York, *September*, 1845.

No. 4222.

What we claim as our invention and improvement, and desire to secure by letters patent, is the combination of the adjustable wheel with the adjustable beam, as described.

THOMAS B. QUIGLEY.
HARVEY HALL.

No. 4223.

What I claim as new, and for which I ask letters patent, is the causing the pens to be raised by the edge of the paper, in its passage through the machine, thus causing each sheet to determine the length of its own lines.

LEWIS EDWARDS.

No. 4224.

Having thus fully described the nature of my improvement in the process of manufacturing the salts of chrome, what I claim therein as new, and desire to secure by letters patent, is the using of wood ashes in mixture with the chrome ore, and with the alkaline salt, for the purpose and in the manner herein fully set forth.

ISAAC TYSON, Jr.

No. 4225.

Having thus fully described my invention, I wish it to be understood that I do not claim an endless platform, formed of sections; nor do I claim the manner of moving them, they having been before used for a horse-power; but what I do claim as my improvement, and desire to secure by letters patent, is the endless sectional platform or carriage, such as herein described, which forms the bed for planing on in combination with the rotating cutters, in the manner and for the purpose set forth, whether the central bar be used or not; and I also claim the sectional platform or carriage in combination with the central bar, for the purpose and in the manner described.

BENJAMIN BROWN.

No. 4226.

I do not claim as my invention the employment of a series of rollers connected by rings at each end around the axle, and within a box, as this has long since been done; but what I do claim as my invention, and desire to secure by letters patent, is making the ends of such rollers on a bevel or mitre, in combination with shoulders, collars, flanches, rings, or other projections on the axle, and on the box or hub, having corresponding bevels or mitres to avoid the rubbing friction at the ends of the rollers, and the more effectually to prevent end play, substantially as herein described.

WILLIAM ROWAN.

No. 4227.

My invention or improvement, and therefore that which I claim, consists in the employment of the perforated plate in combination with the cutting cylinder and feed cutters; the whole being arranged and operating substantially as set forth.

In testimony whereof, I have hereto set my signature this second day of April, A. D. 1845.

JOSEPH S. L. HUNT.

No. 4228.

What I claim as my invention, and desire to secure by letters patent, is the combination of the handle (fig. 1) and the cylinder, (fig. 2,) part of each of which being removed, in the manner and of the shape described in the above specification, for the purpose of receiving the slip of pegs, and to be held therein and conveniently to be advanced, *by means of the thumb of the hand holding the implement*, towards the chisel, (fig. 1 and fig. 2,) which successively splits off the single pegs from the slip, (fig. 1;) said handle and cylinder being constructed either of one entire piece of suitable metal; or, to render the implement less weighty, part of the handle may be made of wood, in the manner fully described above, which latter mode of construction is considered preferable.

JOHN C. BRIGGS.

No. 4229.

I am fully aware that there is nothing new in the employment of a lever and a connecting bar for the purpose of withdrawing or retracing, or otherwise giving motion to an article of mechanism, and therefore I do not lay claim to such; but that which I do lay claim, is the combination of a screw pin with the connecting bar, in such manner as to be applicable to the shank of the knobs, or detachable therefrom, as herein described.

In testimony whereof, I have hereto set my signature this tenth day of September, A. D. 1845.

JOHN CLEVELAND PALMER.

No. 4230.

I shall therefore claim the peculiar manner in which the grate bars are made, so as to operate in connexion with the cylinders, viz: triangular in cross section, so as to present an acute angular or sharp edge for the teeth of the cylinders to act against, in order to remove the bur or burs, as described.

I also claim a toothed fan and grate, in combination with the main and picker cylinders F and G, and grate H, the whole being arranged and used, in connexion with a feeding apparatus, substantially as above described.

In testimony whereof, I have hereto set my signature this second day of July, A. D. 1845.

THOMAS S. WASHBURN.

No. 4231.

Having thus fully described the nature of my improvement in the manner of constructing the fine comb cylinder of a machine for the burring and cleaning of wool or cotton, what I claim therein as new, and desire to secure by letters patent, is the constructing of said cylinder by covering its periphery with metallic plates of such width as may be desired, and extending from end to end thereof, on which plates grooves or channels are to be cut, and the teeth to be formed on one of their edges, in the manner and for the purpose herein fully made known.

ALANSON CRANE.

No. 4232.

What I claim as my invention, and which I desire to secure by letters patent, is replacing cars that have run off the track, by drawing them up logitudinal inclined planes, formed on blocks of any suitable material, connected together and placed in front of the several wheels, and thence on the transverse inclined planes formed on said blocks, immediately in front of said longitudinal planes, and terminating on a level with the rails, down which said wheels are caused to slide, by the gravity of the car, to their proper positions on the track, as set forth.

SAM. H. BEAN.

No. 4233.

What I claim as my invention, and desire to secure by letters patent, is connecting railroad cars, locomotives, &c. by a link provided with a segment of a circular flanch or flanches, embraced in the manner herein described, which will be liberated when the bodies, thus connected, deviate sufficiently from the line of the road, substantially as described, in combination with a spring joint, as herein described, to facilitate the liberation of the link when the car, &c. leaves the track, by a motion upward or downward, as well as horizontal, as set forth.

RICHARD HEMMING.

No. 4234.

What I claim as my invention, and desire to secure by letters patent, is connecting the carriage with the slides (or slide) that operate it, at some points between the middle of its lengths and the ends of the block, so that at each vibration one end shall be moved forward and the other back, as herein described, to form the shingles with that part towards the butt with parallel faces, as specified.

I also claim operating the two sliding blocks that carry the carriage by means of a groove, formed as herein described, in the surface of one cylinder, so that one of the slides shall remain still whilst the other is moved forward, as described. And, finally, I claim connecting the rod that moves one end of the carriage, with its appropriate slitting block, by means of a slide, governed by an adjustable screw or other analogous device, for the purpose of adjusting the face of the block or bolt of wood to the knife for the cutting of the first shingle, as described.

A. S. PELTON.

No. 4235.

Having thus fully described the nature and operation of my improved machinery for manufacturing forks and other articles of a like character, what I claim therein as new, and desire to secure by letters patent, is the manner in which I have combined and arranged the respective parts of the machinery for cutting, filing, or dressing the handles, as herein described; that is to say, I claim the manner of arranging and combining the revolving cutters or files, the pattern by which the form to be given to the handle is governed, the rocking frames which carry the cutters, and the sliding frame, being made to co-operate in their action substantially as set forth.

In that for dressing the prongs, I claim the combination of the revolving wheels with their cutters, and with the rests which pass in between said wheels, for the purpose and substantially in the manner herein made known.

SAMUEL H. GILMAN.

No. 4236.

I do not claim two series of sliding plates or tumblers, arranged side by side, and the one series having recesses in each plate, and the other series having corresponding projections to enter and move in the said recesses, and the one series being affixed to the main bolt, so as to move back and forth, as well as up and down with it, and having a corresponding series of notches or indents in each of its plates, and one spring catch applied to or affixed upon the main bolt, which spring is thrown, by a suitable projection, from the lock case into one of the notches of each of the several plates whenever the bolt is shot forward by the key, and out of the same, by a similar contrivance, when the bolt is retracted, (the projections of the front series of plates being carried so far forward, or out of the recesses of the rear series, when the bolt is thrown forward or locked, as to permit of the fall or vertical depression of each of the plates of the rear series of plates,) all of which will be found to exist in certain locks heretofore patented or sold; but that which I do claim is my specific improvement thereon, the same consisting in the combination with the main bolt and two series of sliding tumblers, constructed and acting together, as above set forth, of a solid stud, (projecting from the bolt;) the slots (cut as above described in the tumblers of the front series) and a vibrating or moving plate applied to the main bolt and rear series of tumblers, as specified, the whole being arranged and operating together substantially as herein before explained.

In testimony whereof, I have hereto set my signature this ninth day of October, A. D. 1845.

WM. HALL.

No. 4237.

What I claim as my invention, and desire to secure by letters patent, is the lower part, or second mill, which receives the bark from the upper and discharges it through the side or bottom of the mill, or both, by the aid of arms or flanges attached to the nub or shaft, which force the bark through grater or double-saw teeth, whichever are used.

ISAIAH SCUDDER.

No. 4238.

Having thus fully described the manner in which I now construct my rotary top stove, what I claim as new therein, and desire to secure by letters patent, is the combining with a stove furnished with a rotary top an oven occupying the whole area of the lower part of the stove, and furnished with flues, arranged and governed in the manner herein set forth. I do not claim either the manner of forming the oven, or of arranging the flues, as in itself new; but I claim them only in their combination with the rotary top stove, by which that stove is rendered much more convenient and efficient than under any former construction thereof.

HENRY STANLEY.

No. 4239.

Having now described the nature of our "improvements in producing and multiplying copies of designs, and impressions of printed or written surfaces," we would have it understood that we do not confine ourselves to the details shown and described, provided the peculiar character of the arrangements or processes be retained. We would also have it understood that we make no claim to many of the separate parts herein described, but what we claim is—

1st. The herein described process, whereby we transfer by means of treating the originals with acids of strengths varying with the induration of the ink, and so pressing out the acid as to cause an etching of the blank spaces, and a reversed impression of the original (where protected from the action of the acid) on metallic surfaces.

2d. The process of reviving the printing ink on originals, by first acting on them with caustic potash on its carbonic and tartaric acid, so as to form cream of tartar in the paper, which prevents the adherence of fresh ink in the blank spaces, while the old ink is left in a state to take up an additional quantity from a roller passed over it.

3d. The herein described process of preventing the adhesion or sticking of printing ink, during the operation of printing, to any part of the plates which are required to remain blank, by acting upon such blank surfaces with acid preparations of phosphorus.

In witness whereof, we, the said C. F. Baldamus and F. W. Siemens, have hereto set our hands and seals this thirteenth day of January, one thousand eight hundred and forty-five.

CARL FREDERICK BALDAMUS.
F. W. SIEMENS.

No. 4240.

I do not claim to have invented "blow-up" or heater, herein described, or any portion of the filtering pipes, cocks, or valves, that most immediately and properly belong to that vessel, as the whole thereof are already well known; but I do claim as new and of my invention—

1st. The application of the intermediate cylinder or vessel, with the connecting pipe, (*i*) steam pipe, and steam cock, for admitting steam, to press on the article under treatment when applied in combination with the buoy float, chain, supply valve, and steam valve, for the purpose of maintaining

a regular and successive supply of liquor and pressure of steam thereon within the vessel, for the purposes set forth, and substantially as described and shown.

2d. The application of the exit pipes and nozles to the filter boxes, to receive and act in combination with the thimbles of the filter leaves or frames, including any merely mechanical variation in the construction of the parts that shall be substantially the same in the means employed and the effects produced.

3d. The mode described of constructing the filter leaves or frames, which may be of wood alone, or of wood and metal conjointly: in either case each framed together in a tapered form, to allow of the bags being drawn tightly on, and easily drawn off, for cleaning, and the combination therewith of the groove and thimbles in the lower frame piece, when such mode of construction and combination, or any variations substantially the same, are used for any of the purposes herein set forth.

4th. The application of tapered filter bags to envelope the frames when used in combination with the means of securing the same on the frames by the tightening rod, (1,) and staple clasp, (2,) for the purposes set forth and substantially as described and shown.

In witness whereof, I, the said Ethan Campbell, have hereunto set my hand, in the city of New York, this fifth day of April, in the year one thousand eight hundred and forty-five.

ETHAN CAMPBELL.

No. 4241.

Furthermore, I claim as my invention the adaptation of the above described shutters in said board that prevents the sound from escaping only at the pleasure of the player on the piano forte; I also claim as my invention the above described arrangement of the shutters as connected with the pedal, to give the motion of the shutters by the use of the pedal; I claim, also, as my invention, the combining the swell with the piano forte by means of a covering over the strings, and having shutters in said covering, as above described, so as to confine the sound; and, with the use of the pedal, as above described, the shutters in said board are made to open and shut, gradual or quick, at the pleasure of the player, and can produce the crescendo and diminuendo tones, or swell in the piano forte, as above described; and, by opening and shutting the shutters quick, the player can produce the explosive and pressure tones by the above described mode, by the use of the pedal.

EDWARD BADLAM.

No. 4242.

What I claim as my improvement or invention, and desire to secure by letters patent, is the combination of materials and proportions, as embraced in this application, for making into various articles that the composition will admit of, by moulding, twining or pressing, burning, and glazing, which is a great improvement for some articles over clay, in use of ochre.

JOEL FARNAM.

No. 4243.

What I claim as my invention, and desire to secure by letters patent, is the combination of the hook and key, constructed in the manner set forth, crossing each other, and thereby forming a double inclined plane, so that by turning the key they are locked and the joints drawn tight, as herein described.

IRA SMITH.

No. 4244.

What I claim as my invention, and desire to secure by letters patent, is the combination of the two sets of knives for slitting and cutting off, with the bevel guiding rims for crushing and grinding fodder and other substances, as herein described.

JESSE URMEY.

No. 4245.

Having thus fully described my improvements, what I claim as my invention, and desire to secure by letters patent, is the shank of the tooth, so formed of thin metal as to receive a wedge in its recess, in the manner described, for the purpose of firmly connecting it with the beam in all directions, as set forth.

DAVID B. ROGERS.

No. 4246.

Having thus fully described the nature of my improved hat, which is principally intended for the use of watchmen and firemen, I do hereby declare that I do not claim to have invented anything new in the manner of forming such hats, but what I do claim as new, and desire to secure by letters patent, is the manner herein described of forming or combining of welts or ribs with hats having bodies of wool, as represented at AA, in the accompanying drawing; such ribs being strengthened by filling the inside of the same with any suitable material, in the manner set forth, by which combination I form a hat, as hereinbefore stated, of a material not hitherto considered as applicable thereto, and possessing the desirable properties of lightness, and of being brought into market at a cost far below those that have been heretofore made.

JAMES BROWN.

No. 4247.

What I do claim, however, is the combination of the feeder, as described, with the bulged form of the back. I further claim the drawing in the upper segment of the back, over the coal, in combination with the shelf above the grate, and this I do claim without reference to the bulging of the lower segment.

JORDAN L. MOTT.

No. 4248.

What I claim is the *combination*, as follows: The top range or stove, furnished with both *rotary boiler plates* and *stationary* boiler *openings*, in combination with the *divided draught*, by which the *heat* can be made to act either on the rotary plate or the stationary boilers, or both, at pleasure, by merely changing the dampers.

JORDAN L. MOTT.

No. 4249.

And, therefore, what I claim as my invention, and desire to secure by letters patent, is the series of eccentric or regular saw plates on the cylinder, in combination with the comb, for the purpose of cutting corn in the ear, or other substance, substantially as herein described, and in combination therewith. I also claim the conical mill for grinding the grain, &c., after being cut, substantially as herein described.

J. P. ROSS.

No. 4250.

Having thus fully described the construction and operation of my labor saving cart, what I claim therein as new, and desire to secure by letters patent, is—

1st. The combination of the shaft, crank, pinion, spur wheel, ratchet, pulleys, and straps, and elevated cross piece, arranged and operating substantially in the manner and for the purpose herein set forth.

2d. I also claim the combination of the tail board, balance levers, straps, and cross piece, arranged and operating substantially in the manner and for the purpose herein set forth.

3d. I also claim the combination of the bolt, spring V, spring catch W, upon the tail board, and metallic plate, upon the axle, arranged and operating substantially in the manner and for the purpose herein set forth.

THOMAS MUSSEY.

No. 4251.

What I claim as my invention, and which I desire to secure by letters patent, is the combination of the strap, metallic plates, or bars, connected by a cross bar, and suspended on pivots, levers, and nicked plate, as set forth, for securing of the machine to the timber to be bored, said strap being hooked to the lever and passed under the timber, around the rollers, and between the bar and the side of the box, as described.

A. WEIKART.

No. 4252.

What I claim as my invention, and which I desire to secure by letters patent, is combining the internal escritoir with the external folding desk, in the manner and for the purpose set forth.

JOHN WHITE.

No. 4253.

Having thus fully described my apparatus for tanning hides, what I claim as my invention, and desire to secure by letters patent, is the combination of a traversing carriage for distributing the ooze on the hides, substantially as above described, with a vat or vats, in which said hides are suspended, and from which the spent liquor can drain.

FRANS. D. PARMELE.

No. 4254.

Having thus fully described the construction and operation of my improvement, what I claim as new therein, and desire to secure by letters patent, is the useful combination of the brake or rubber with a shaft or shafts, jointed to the goosenecks by a rule joint, in the manner and for the purpose herein set forth and fully made known.

WILLIAM DUNNING.

No. 4255.

What we claim as our invention, and desire to secure by letters patent, is the construction of a fracture apparatus with four adjustable side-splints, connected with each other by means of circular metallic hoops or bands, the upper and lower sets of splints being connected by means of the quadrant hinge joint and the ankle joint, similarly constructed. We do not claim these parts separately, but in combination, as above described.

WM. MILLS.
MAHLON HOAR.

No. 4256.

What I claim as new, and desire to secure by letters patent, is the arrangement of the draught in combination with the stoke flue, by which the smoke flue becomes the stoke flue, in the manner described.

RUSSEL WILDMAN.

No. 4257.

I am aware that the washing machine, the keir for boiling, first in lime and then in an alkali, the "chemics" or vats for containing the chlorine, and the "sours" or vats for containing the acid solutions, have all heretofore been used separately, the pieces of fabric being attached together to introduce them to the washing machine, and then separated to transport them by hand to the keir, and then retransported and re-attached, to rewash them, and the same with reference to the chemics, and sours, and the washer, the whole of these operations of attaching, detaching, conveying, and reconveying being done by hand; and therefore I wish it to be distincly understood that I do not claim as my invention the using of those in succession in the process of bleaching, nor do I claim the passing of wet fabrics from a tub or vat, between rollers, to force out the liquid, as this combination has heretofore been known and used; but what I do claim as my invention, and desire to secure by letters patent, is combining the wash-

ing machine with the keir, by means of carrying rollers or belts, provided with a reversed motion, so that the fabrics can be conveyed from the washer to the keir, and back from the kier to the washer, as herein described.

I also claim combining the washer with the several chemics or vats for containing chlorine, &c., in the manner described, so that the fabric may be conveyed from the washer to the chemics and the squeezing rollers, as herein described, and, in combination with this last combination, the arrangement of the "sours" or vats for containing the acid solution, and the set of squeeze rollers which receive the fabrics from the sours after they have been conveyed therein from the first set of squeeze rollers, and reconveying them to the washer, as herein described.

And, finally, I claim combining together the washing machine, the keir, and the chemics, the first set of squeeze rollers, the sours and the second set of squeeze rollers, in the manner described, by means of which the various operations in the process of bleaching are connected together, so as to convey and reconvey the fabrics from the one to the other in the order required, substantially as herein described.

MOSES PIERCE.

No. 4258.

Having thus fully described the nature of my improved ink holder, and shown the operation thereof, what I claim therein as new is making the rotary top of the ink holder, with pen holes, and a cup-formed recess in the middle, fitting in a large central opening in the permanent top, which is also provided with pen holes, in like manner, as the rotating top; when the two are combined by means of the spring handle, which secures the two together, and affords an easy and ready mode of removing the top to supply ink, whilst it answers the purpose of a ball handle, to carry the ink holder.

And I do hereby declare that I do not intend to limit myself to the particular form of the respective parts, as herein set forth and represented, but to vary these as I may think proper, whilst the general form and combination are substantially the same with those herein fully made known.

DANIEL HARRINGTON.

No. 4259.

Having thus described my invention, I shall claim the above described peculiar manner in which I arrange the cylinder with respect to one or two melting cisterns, and the furnace whereby the said cylinder is heated wholly or partially by the fire of the furnace, and receives its supply of lead, as above specified.

I also claim the combination of the air chamber with the forcing cylinder, and the pipe former, in the manner and for the purpose or objects as above specified.

I also claim the arrangement of the air chamber within, or partially within, the melting cistern or cisterns, for the purpose of melting any lead which at any time may congeal, or may have congealed, within the said air chamber, the said lead being rendered fluid by means of heat proceeding from the molten lead of the kettles, and passing through the sides (or a portion thereof) of the air chamber.

In testimony whereof, I have hereto set my signature this nineteenth day of July, A. D. 1845.

NATHAN BUTTRICK, Jr.

No. 4260.

We claim the method, herein described, of forming the oven bottom, and uniting it with the flue division plates, by the bent or curved edges of the plates forming the oven bottom, and fitting against the division plates of the flues in such manner as to receive a current to render the joints air-tight, substantially as herein described.

JOHN B. CHOLLAR.
EBER JONES.
PETER LOW.

No. 4261.

What we claim as our invention, and desire to secure by letters patent, is "the combination of the forceps handles, with the manner of controlling the hook, substantially in the manner and for the purpose described."

JOHN W. BAKER.
WILLIAM WILLSHIRE RILEY.

No. 4262.

What I claim as my invention, and desire to secure by letters patent, is the combination of the mallets and spring-hooks with the treadles for operating the mortising tools; that is to say, I claim attaching spring-hooks, having their lower ends tapered, to the sides of the sliding mallets, which, on the descent of the said mallets, come in contact with stops or cams on the frame, by which the direction of the hooks is changed inward, causing the hook to pass under the head of the cutting tool simultaneously with the descent of the mallet, so that when the mallet is again raised with the hook, it draws up with it the cutting tool to the desired height, when the hook, by its tapered form and effort to assume its original position, recedes from the cutting tool, until it is entirely liberated from it.

ALMON DOWNS.

No. 4263.

Figure 1 represents a plough when completed, the beam and handles of which are made of wood, and are in the usual form. I make no claim to securing the parts by a single bolt; but what I do claim as my invention, and desire to secure by letters patent, is the combination of the point, cutter, and mould-board, by means of the mortises in the point and the cutter, the tenon on the lower edge of the cutter, and the dovetail tenon on the land side of the mould-board, so as to unite them and render them more permanent and durable than ploughs now in use.

JOHN BALL.

No. 4264.

Having thus fully described my improvement, I wish it to be understood that I do not claim as my invention the close cylinder, having projections

thereon, nor do I claim constructing the concave with projections from its inner surface; but what I do claim as my invention, and desire to secure by letters patent, is the combination of a *close* cylinder, not admitting air at the ends, constructed, as above set forth, with a concave, having vertical projections thereon between the rows of holes in the said concave, in the manner and for the purposes herein described, and in contradistinction to an *open* cylinder, with said projections combined.

I also claim the fan, constructed in the manner described, with inclined heads to the case, for the purpose described, in combination with the smut machine; all arranged as herein set forth.

JOSEPH JOHNSON.

No. 4265.

Having thus fully described my improvement, what I claim therein as new, and desire to secure by letters patent, is the combination of the cutter or shears, projecting down in the centre, so as to commence cutting in the middle of the plate, with the die forming the teeth of the cultivator, substantially in the manner and for the purposes set forth.

DAVID B. ROGERS.

No. 4266.

Having thus fully described the nature of my improvements in the illuminating vault cover, what I claim therein as new, and desire to secure by letters patent, is the combining with the covering plate a series of glasses of any suitable form, or of lenses such as are shown at AA; said combination being effected substantially in the manner described, by the aid of laminæ of wood, or of soft metal, as shown at CC, and the glasses or lenses being defended from injury by knobs, or protuberances, as herein set forth.

THADDEUS HYATT.

4267.

What we claim as our invention, and desire to secure by letters patent, is—

1st. The combination of the reel with the hinged carriage for holding and turning the staves, to be planed, as described.

2d. We also claim the combination of the apparatus for crozing, chamfering, and cutting the staves to the required lengths, as herein described, to wit: the lever, with its holding arms, the holding beds, the swinging arms, cutters, and discharging springs, arranged and operated substantially as set forth.

3d. We likewise claim the arrangement of the circular saws on the inclined sliding shafts, for jointing the staves to the required bevel, in combination with the inclined planes or arms for rendering the apparatus self-acting, as described.

JOHN MINER.
SILAS MERRICK.

4268.

As all the parts herein described and shown, taken separately, have been

used before, for various purposes, I do not claim to have invented any of such parts, but I do claim as new, and of my own invention, and desire to secure by letters patent,

1st. The mode described of giving any required angle or bevel to the shoulders of tenons, by the operation of the bearer and screw, in combination with the means of fixing the length between the tenon shoulders by the slide stop-spring and set screw, as they are described herein.

2d. The model of mounting the tenon planes on frames in cross-slides on the carriage, in combination with the means of adjusting the depth of each tenon, by gauge screws, slide and catch 7, and set screw 8, and the further combination with these parts of the springs to force the planes towards the centre of the machine, in the act of cutting the tenon, substantially as is herein described.

In witness whereof, I have hereto set my hand, in the city of New York, this sixth day of July, one thousand eight hundred and forty four, in the presence of the witnesses subscribing hereto.

JAMES BIGGS.

No. 4269.

Having thus fully described our improvements, what we claim as new, and desire to secure by letters patent, is the combination of the variable fire-chamber with the boiler, constructed and arranged as described.

R. PECK.
JAMES W. COCHRAN.

No. 4270.

I do not claim the series of notched circular plates, &c., simply; but that which I do claim is the combination of the geared change wheels or plates CC, &c., with the said notched plates applied to them, and acting in connexion with them, and operated by an arbor and tooth, or cam, or other mechanical equivalents, substantially in the manner as above described.

I also claim the combination of mechanism by which the tongues or projections of the latch are kept from contact with their respective circular notched plates, when the main bolt is locked or thrown forward, the said combination consisting of the balance or fly-wheel, chain, and spring, or other mechanical equivalents, the slide-plate, lever, (connected to the slide H,) and the slide *u*, the whole being arranged and operated by the arbor and its tooth, substantially as above set forth.

In testimony whereof, I have hereto set my signature, this first day of November, A. D. 1845.

HENRY ISHAM.

No. 4271.

Having pointed out the principle of my invention, and the manner of constructing and using the same, and indicated some of the variations in construction, which may be made without changing the principle or character which distinguishes it from all other things before known, what I claim as my invention, and desire to secure by letters patent, is communicating the motions to the pen or pencil by means of cams acting on frames,

so that the vertical and horizontal strokes can be given by separate movements, and the oblique and curved strokes by the combined action of the two, substantially as herein described.

And I also claim giving to the sheet of paper, or other substance to be written upon, a horizontal movement for spacing off the letters, and a vertical movement for the lines, in combination with the movements of the pen or pencil, substantially as herein described.

CHARLES THURBER.

No. 4272.

Having thus fully described my improvements, what I claim therein as new, and which I desire to secure by letters patent, is the combination of tubes, as subscribed on the inclined planes, with the double shell of the drawer, in the manner and for the purposes set forth.

CHRISTOPHER SUYDAM.

No. 4273.

Having thus fully described the manner in which I construct my portable forge, and arrange the respective parts thereof, what I claim therein as new, and desire to secure by letters patent, is the combination of the curved sliding-shutters for enclosing the space over the fire, and the device for admitting a draught of air to keep up the combustion during the intervals in which the bellows are not employed; the same being effected for the purpose and substantially in the manner made known.

CHRISTIAN V. QUEEN.

No. 4274.

What I claim as my invention, and desire to secure by letters patent, is the combination and arrangement of the fire-chamber and roasting-oven, having doors opening into the fire-chamber when direct radial heat is required in the oven.

I also claim the combination of the boiling apartment and baking-oven, constructed in the manner set forth.

JOHN PORTER.

No. 4275.

Having thus fully described the nature of my improvement in the manner of forming hat bodies of wool, fur, or other suitable material, what I claim as new therein, and desire to secure by letters patent, is the manner herein set forth of saving the labor of reblocking and of ironing such bodies, by interposing between them and the block a material to which resinous stiffening will not adhere, or to which, if it adheres, said material will not adhere to the block; by which device, in either case, the body may be allowed to dry upon the block, and may be removed therefrom in perfect form.

MARMADUKE OSBORNE.

No. 4276.

What I claim as my invention, and desire to secure by letters patent, is the mode, herein described, of hanging the car body, and governing its lateral motion; that is to say, the spring-bolster constructed and governed in its motions substantially as herein described, in combination with the springs and shackles; the whole being constructed and operating substantially as herein set forth.

LEVI B. THYNG.

No. 4277.

We claim the combination with a cam, or other mechanical equivalent of mechanism, substantially as set forth, for laying a sliver therein in eccentric helices, as above described; also the combination with the above of a corresponding frame or plate, disposed over it and operating so as to condense the material, or force it into the cam, as above specified.

In testimony that the foregoing is a correct specification of our said invention, we have hereunto set our signatures, this second day of August, in the year of our Lord eighteen hundred and forty five.

JOHN TATHAM.
DAVID CHEETHAM.

No. 4278.

What I claim as my invention, and desire to secure by letters patent, is the method, herein described, of uniting the various parts in making shirred or corrugated India rubber fabrics, by passing the cloth and strips of India rubber between pressure-rollers, one or both of which is grooved in the manner described to receive the strips of India rubber, and make pressure on cloth between the strips, as herein described.

And I also claim connecting the driving feed roller with the gearing which drives it, by means of a ratchet, to admit of turning it back to stretch the strips of India rubber, when this is combined with pressure rollers, the peripheries of which move with greater velocity than that of the feed rollers, as herein described.

JAMES BOGARDUS.

No. 4279.

Having thus fully described my improvements, what I claim as my invention, and desire to secure by letters patent, is, first, forming a recess in the breast of a chimney, over the arch of the fireplace, for the reception of external air, and delivering the same in a thin stratum, as herein described, the whole width of the arch, in the manner and for the purposes above set forth.

I also claim gathering the throat of the flue, as above described, by curving out from the side that the flue is to be carried up on, and curving the other side up over it, as above specified.

JOHN PLANT.

No. 4280.

I am aware that a series of cutters, or disks, have been secured on a shaft by means of a nut, and therefore I wish to be distinctly understood that I do not claim this as my invention; but what I do claim as my invention, and desire to secure by letters patent, is the method herein described of adjusting the cutter edges of two series of cutting wheels, which fit between each other, by having each series to slide endwise on a shaft, so that the edges of the two series can be forced into contact by a nut, wedge, spring, or other analogous device, as herein described.

JAMES BOGARDUS.

No. 4281.

What I claim as my invention, and desire to secure by letters patent, is extending the tube below the traverse rail, in the manner and for the purpose set forth.

ALEXANDER ANDERSON.

No. 4282.

What I claim as my invention, and desire to secure by letters patent, is the introduction of the arch in the middle of the bottom, whereby I am enabled to obtain great power of resisting the strain caused by the tension of the wire strings of the piano forte, besides other advantages in improving the qualities of the instrument by keeping the case always in shape, so that it cannot draw up or "wind," as is invariably the result in the present mode of manufacture, and consequently keeping the instrument in tune and order for a much longer period.

Witnessed the sixth day of September, in the year of our Lord one thousand eight hundred and forty-five.

WILLIAM F. SENIOR.

No. 4283.

Having thus fully described the manner in which I construct my planing and jointing machine, and shown how the respective parts thereof operate, what I claim therein as new, and desire to secure by letters patent, is the manner herein set forth of forming, arranging, and combining with the revolving cutter wheel, the revolving platform, and the endless aprons between which the board to be planed is to be passed; by means of which arrangement and combination it is firmly held along the whole length of such apron, and carried regularly forward, without deviation.

JOSEPH E. ANDREWS.

No. 4284.

What I claim, and desire to secure by letters patent, are the flue passages across the top of the stove for the fire and heated air, after the same have been made to pass round the oven, and up to the top of the flue in front of the fireplace, to be continued to the stove pipe, as above described.

ELI C. ROBINSON.

No. 4285.

What I claim as my invention, and desire to secure by letters patent, is combining the elevating screws with the frame of the propeller, by means of openings therein to receive the same, so constructed as entirely to exclude the surrounding water from that part of the screws which is within the frame, the whole being constructed and arranged substantially as herein set forth.

R. F. LOPER.

No. 4286.

What I claim as my invention, and desire to secure by letters patent, is making the apertures, O, in the wheel, for the introduction of the water to the buckets, to extend through the outer or cylindrical perimeter thereof, near the top, and then spirally down through, between the buckets, to the bottom thereof, in the manner described, in combination with the funnel-shaped inner rim and curved buckets, as set forth, whether the water be introduced from the inside or outside of the wheel, as before stated.

I also claim the combination of the sliding frame, and segment valves connected therewith, by rods or stems of unequal lengths, for letting on the water by degrees, in the manner set forth.

WILLIAM DRIPPS.

No. 4287.

I claim the mode of producing the camber of the truss, viz: by the distension wedges, or apparatus, as above described, applied between the ends of the bars of the upper stringer, or chord, *in combination* with the contractile and cambering chain, made and applied to the lower or other suitable part of the truss, and operating substantially as above specified.

In testimony whereof, I have hereto set my signature, this eleventh day of September, A. D. 1845.

NATHANIEL RIDER.

No. 4288.

What I claim as my invention, and desire to secure by letters patent, is the method herein described, or any other substantially the same, of indicating the rise and fall of water in a steam boiler or generator, by means of an indicator outside thereof, actuated by a magnet, connected with a float or any other body within the boiler, that rises and falls with the water, and connected with the magnet, substantially as herein described.

GEORGE FABER.

No 4289.

What I claim as my invention, and desire to secure by letters patent, is connecting the cross-head of a reciprocating engine with two crank shafts on opposite sides of, and at equal distances from the centre of vibration, by means of a connecting rod or lever turning on the cross head, and reciprocating with it, and taking hold of the cranks on the two crank shafts, by

which they are caused to turn in opposite directions, and with equal velocities, as herein described.

R. F. LOPER.

No. 4290.

Having thus fully described my improvement, I wish to be understood that I do not claim as my invention the employment of a submerged horizontal wheel within a case in the vessel, as that has before been essayed; but what I do claim as my invention, and desire to secure by letters patent, is the case above described, into which the propellers are inserted, to be placed on the outside of a vessel, of the usual form of sailing vessels, which is independent of and can be taken from said vessel, in combination with a series of horizontal propellers placed one before the other, in the manner set forth.

STEPHEN R. PARKHURST.

No. 4291.

What I claim as my invention, and desire to secure by letters patent, is the manner of attaching pressers to the levers, by the rods and cords, so as to produce the effect above stated.

GREY UTLEY.

No. 4292.

I do not claim adjusting the clevis with a screw and moving swivel hook, as in the "Gallatin plough;" but what I do claim as my invention and improvement, and which I desire to secure by letters patent, is the mode of raising and lowering and confining the ring against the inner side of the front or vertical part of the clevis, by means of a segment grooved wheel, or head, raised and lowered by a vertical screw turning in a female screw, in the upper or horizontal part of the clevis; by which combination and arrangement the weakening of the clevis, arising from the necessity of cutting the usual notches in it for holding the ring, is avoided, and the dropping of the ring is prevented; the said segment grooved wheel holding the ring against the front part of the clevis at the height desired, and made adjustable to any required level, for various depths of ploughing, as set forth.

PATRICK GALLAGHER.

No. 4293.

Having thus described the principle of my invention, and the various modes in which I have contemplated its application, I wish it to be understood that I do not claim the propelling of boats, &c., by the reaction of issuing streams of water, when effected by steam or other power, on the boat, &c.; but what I do claim as my invention, and desire to secure by letters patent, is the method of propelling boats on canals, or cars, or railroads, by means of a column or columns of water discharged from an upper level or reservoir (not in moving with the boat) to a lower level, by means of a syphon or syphons, attached to and moving with the boat, or car, in manner substantially as herein described.

JOSEPHUS ECHOLS.

No. 4294.

Having thus fully described my improvement, what I claim as my invention, and desire to secure by letters patent, is the combination of the above scale of subdivided measures, and the protractor, in the manner described, so that the angles for laying out any sized coat shall be given by the protractor from the points found, by measuring the person to be fitted by means of the scale, as herein set forth.

ABM. A. BOGARDUS.

No. 4295.

What I claim as my invention, and which I desire to secure by letters patent, is preventing the fire and ashes escaping from the stove through the draught openings, by dividing the base or lower box of the stove into a number of apartments, communicating with each other, formed by a horizontal perforated plate and vertical perforated plates, in the manner and for the purpose set forth.

WM. BUTCHER.

No. 4296.

What I claim as my invention, and desire to secure by letters patent, consists in a peculiar manner of working the water ram in combination with the syphon, by the use of a chamber of rarified air, for the purpose of causing the escape-water to flow down the longer leg of the syphon in a continuous stream; also, in the use of channels in the packing of the joints, supplied with water from the air vessel of the ram, for the purpose of excluding, completely and with certainty, the external air from the syphon; also, in the fixtures herein described for the setting in motion and regulating the quantity of water consumed by the ram.

ERASTUS W. ELLSWORTH.

No. 4297.

Having thus explained my invention, I shall claim the plate as combined with the sliding frame for the purpose of receiving the cap plate of any mould of various moulds, as described; also the making the whole frame, plate, toggles, lever, and bars, and rest block of the toggles, adjustable with respect to the mould or bed plates upon which it is placed, in the manner as above described.

In testimony whereof, I have hereto set my signature, this eighteenth day of July, A. D. 1845.

JOSEPH MAGOUN.

No. 4298.

I claim the quadrangular invented pyramidal form of the grate in combination with the side doors, hinged at the bottom and opening downwards, to answer the purpose of hearths, that the whole surface of the fire at the sides may be presented, and the rays therefrom may be cast on to instead of over the article to be cooked or heated on the hearths, as herein de-

scribed. And, finally, I claim the method of sustaining the side doors when open, by means of the jointed and sliding links, as herein described.

C. L. H. WEBB.

No. 4299.

I claim the arrangement of the parts by which I supply the fire with heated air; said arrangment consisting mainly of the sliding register and the plate in front of which the air must descend on its passage to the grate bars. The heating of the admitted air has been attempted under other arrangements, and I limit my claim in this particular, therefore, to the special combination of parts by which I attain this end.

SAMUEL PIERCE.

No. 4300.

In the machine described I claim making the *concave plate or disk* with a concave face and circular opening, provided with a lever and upper lip for the discharge of the cobs, in combination with the sheller and with the shell or bottom, and also the door or valve in the side for the broken cobs, &c.; and also the cylindrical *hopper and spring in combination with the feeder*, as herein described.

THOMAS D. BURRALL.

No. 4301.

Having thus fully described the nature of my improvements in the air-heating furnace, what I claim as new therein, and desire to secure by letters patent, is combining with such a furnace the evaporating and radiating vessels or vessel M, arranged, combined, and operating substantially in the manner and for the purpose herein made known.

EBENEZER BARROWS.

No. 4302.

What I claim as my invention, and desire to secure by letters patent, is making the ends of the fluted, grooved, or ridged ginning rollers, without the flutes, grooves, or ridges, so that they shall run on each other, and thus prevent the injurious action of their parts operating on each other and on the fibres of the cotton, as described.

I claim the rotating, stripping, or cleaning rollers, in combination with the ginning rollers, for the purpose and in the manner substantially as herein described.

I also claim the feeding roller and beater or blower, in combination with the ginning rollers, for the purpose of loosening the cotton, and presenting it to the action of the ginning rollers, as described.

And, finally, I claim the beater or blower, in combination with the ginning rollers, for the purpose and in the manner described.

THEODORE ELY.

No. 4303.

Having thus fully described the manner in which we construct and arrange the various parts of our apparatus for heating apartments, and shown the operation of the same, what we claim therein as new, and desire to secure by letters patent, is the manner of combining and arranging the radiating air heaters so that the air to be heated by them shall ascend on both sides of them, or shell, or case, or casing of brickwork, performing the same office, as set forth; and the fireplace above the top plate being so enclosed by a suitable plate, or by masonry, as to cause the whole of the air heated by the radiators to pass into the apartment, in the manner described.

We do not claim the use of a radiator or radiators, like those marked B, as new, such having been before used; but we limit our claim to that arrangement of them by which they are made to heat an ascending current of air on each of their sides, for the purpose herein fully made known.

We do not intend, however, by this claim, to limit ourselves to the particular form of either of the parts of the said apparatus, but to vary these as we may think proper, whilst we attain the same ends by an arrangement of parts substantially the same.

HENRY KATUSSOWSKI.
J. P. WIERZBICKI.

No. 4304.

Having thus fully described the manner in which I combine the railway and canal for the purpose of transportation, what I claim therein as new, and desire to secure by letters patent, is the combining of a railroad and canal by laying rails on the bottom of the canal, which is to be used, and the rails submerged with its content of water, by the employment of a locomotive engine and of car-boats, which, whilst their wheels are sustained upon the rails, are to be buoyed up by the water, as set forth.

I claim the adapting of the car-boats and the lock chamber to each other, so that when the former are contained within the latter they shall operate as lock gates by preventing or nearly preventing the passage of water, thereby allowing the lock gates to be opened and the train to pass through the lock with little loss of water, upon the principle and substantially in the manner herein described.

SAM'L S. WALLEY.

No. 4305.

What I claim as my invention, and desire to secure by letters patent, is cutting and making the sails of all kinds of vessels with the warp of the cloth and the seams in a horizontal direction, for the purpose and in the manner described.

JAS. MAULL.

No. 4306.

My claims in the above described invention are confined to the filter tube, in combination with the funnel, plunger, spring, and perforated bot-

tom, arranged substantially in the manner and for the purposes herein above described.

WALTER HUNT.

No. 4307.

I do not claim as my invention hanging a gate on a central axis, so as to open in either direction, and close without a return movement, as this has long since been effected; but what I claim as my invention, and desire to secure by letters patent, is such a gate hung and turned on a central axis in combination with the fence arranged around the axis of the gate, and provided with two carriage or other ways on opposite sides, as herein described, and for the purpose specified.

ANDREW HOOD.

No. 4308.

What I claim as my invention, and desire to secure by letters patent, is forming the face of the shuttle cams with a depression, as herein described, to permit the picker to be moved back clear of the shuttle point, after the shuttle has been arrested, and before the shuttle boxes are shifted, as herein described.

ROBERT P. CUNNINGHAM.

No. 4309.

Having thus described my improvement, what I claim as my improvement, and desire to secure by letters patent, is a boiler surrounding a furnace, as herein described, in combination with a flue ascending and returning in an apartment at the foot of the bath, as above set forth.

WM. G. YOUNG.

No. 4310.

I am aware that, for cooking and other purposes, kettles have been set directly into a steam boiler, so as to have the steam in the boiler act directly against their bottoms, but this has always been limited to one kettle for each boiler, which, if applied to the manufacture of sugar, would require one boiler for each kettle in the series, presenting not only the objection of great cost in the original construction, but much labor in attendance, as well as the important difficulty in keeping up an equal temperature under all the kettles at the same time, which is frequently required; and, therefore, I do not wish to claim simply letting a single kettle into a steam boiler, to have the steam act directly on the bottom thereof, nor do I wish to claim simply the insertion of a series of kettles in one boiler for general uses; but what I do claim as my invention, and desire to secure by letters patent, is the arrangement of a series of kettles for evaporating saccharine juices and sirups in the manufacture of sugar, on the top of and let into one steam-boiler, when any method is employed of regulating the temperature of the kettles—that is, reducing or increasing the temperature of a portion of the series without affecting the rest—substantially as herein described.

I also claim arranging the series of evaporating kettles let into the top of

one steam-boiler, to have them exposed directly to the action of steam within the boiler, in combination with the arrangement for heating the pans, for preparing the saccharine juice, by means of steam conducted from the boiler into the double bottoms of the pans, as herein described.

And I also claim dividing the boiler into two or more compartments by a partition or partitions, provided with a valve, in combination with the arrangement of kettles let into the boiler, for the purpose of regulating the temperature, as herein described.

F. DUPLESSIS.

No. 4311.

I do not claim to have invented the mode of causing a circulation of water between a principal boiler of water back and the boiler A, by the pipes *g* and *h*, as this is in common use, neither do I claim to have invented the arrangement or application of the pipes *k* or *l* to the circulation of hot water within a building, except as hereinafter stated; but I do claim as new, and of my own invention—

First. I do not claim to have invented or introduced the pipe to lead in the supply of water from any competent head, but I do claim the mode described of forming this pipe with perforations or orifices near the boiler head, for the purpose of securing the boiler against accidental injury, in the manner and with the effects described and set forth.

Second. I do not claim to have invented the hollow plug of the cock, but I do claim the mode of making and fitting the said plug with the short slots, to draw hot water by the bib, in combination with the long slot, at right-angles with the two former, for the purpose of maintaining a circulation of hot water in the pipes *h* and *l*, or suspending the same by twining the blank part of the plug to the pipes *h* and *l*, substantially as the same are described and shown.

In witness whereof, I have hereunto set my hand, in the city of New York, this thirteenth day of May, one thousand eight hundred and forty-five.

WM. BEEBE.

No. 4312.

Having thus fully set forth the manner in which I arrange and operate a water table or weather strip at the bottoms of doors, what I claim therein as new, and desire to secure by letters patent, is the particular manner in which I have combined the respective parts, as herein described; that is to say, the water table being forced down by the action of the head of the rod on the inclined plane, through the intervention of the levers, and being raised by the spiral springs when the door is opened; and the necessary adjustments being also effected by the aid of the screw nuts and spiral springs, substantially in the manner described.

A. S. PELTON.

No. 4313.

What I claim as my invention, and desire to secure by letters patent, is the manner of restoring hollow cheeks to their natural contour and rotun-

dity by means of metallic bulbs, formed, fitted to, and secured in the mouth, substantially in the manner herein set forth, or by any other attachment between the jaw-bones and the cheek.

JOHN ALLEN.

No. 4314.

What I claim as new, and desire to secure by letters patent, is the method of forming tobacco "lumps" by means of the frame and series of blades, arranged and formed substantially as herein described, in combination with the bed, whereby I save much labor in arranging the tobacco leaves, &c.; and I am enabled to form and press a large number of "lumps" at one operation, to lay the covering smooth and even, give a more perfect form, and discharge them from the moulds in which they have been formed with greater facility than by the old method.

HENRY MOORE.

No. 4315.

What I claim as my invention, and desire to secure by letters patent, is the method of retaining types in their proper relative positions on a cylindrical bed by means of rules or strips of metal, or other appropriate substance, fitting into recesses made for that purpose in the body or stem of types, substantially in the manner described.

RICHARD HEMMING.

No. 4316.

I do not claim to have invented any of the several parts described herein as used by me for these conjoined purposes, as each part, taken separately, is well known.

But I claim as new and of my own invention, and desire to secure by letters patent, the mode of applying the rack frame, and lifting shoe and toothed wheel, to raise the hind wheels from the ground, in combination with the action of the blockers, stays, slide 14, and screw clip 15, to hold the engine in place of working; and I claim the mode described of fitting the arms and the levers, and connecting the same by the crank pin headed screw, to receive the brake rods, and convert the hind wheels into fly wheels, in combination with the described means of connecting the parts with the working pistons, when used for the purpose herein set forth.

In witness whereof, I have hereunto set my hand, in the city of New York, this second day of September, one thousand eight hundred and forty-five.

ERNEST MARX.

No. 4317.

I do not claim as my invention the pistons, valves, or any other known part of the engine, herein before described, nor do I claim the passing the steam from one cylinder to another, that having been done by Wolf, and others; but I claim as my invention, and desire to secure by letters patent, the connecting the pistons of the two cylinders to cranks placed at right angles, in combination with the admitting the steam directly from the boiler into the cylinder only, and the working the steam exhaustively in said cylinder, together with the employing the steam to act simultaneously on both pistons during half the stroke, as hereinbefore described, by opening

a communication alternately, and keeping the same open during only half the stroke between the two cylinders, whilst at all times a vacuum is kept up during the entire stroke in both cylinders, on the opposite sides of each of the pistons to that on which the steam acts.

And I also claim as my invention the momentary stoppage of the exhaust pipe of that cylinder, which receives the steam from that cylinder into a receiver partially filled with tubes, through which the feed water is passed on its way to the boiler, in the manner hereinbefore described.

J. ERICSSON.

No. 4318.

What I claim as my invention, and desire to secure by letters patent, is the new and improved mode, above described, of arranging and adjusting metallic wires, or other conductors to electro magnetic and galvanic telegraph instruments, by which instruments, at opposite extremities of the same, or of a single main wire, or located at distant points on the same main wire, or a single wire, may be kept in constant readiness for use, in conjunction with a galvanic battery, without the necessity of keeping the galvanic circuit closed, or the battery in action, when neither instrument is at work; and by which the battery is put out of action instantly on the ceasing of the motion of the instrument, and in like manner is put into action immediately on commencing the motion of an instrument, and avoiding the disadvantage heretofore experienced in what have been denominated *dependant* circuits, in the working of two or more telegraphic instruments over a single circuit of wire, or of wire and earth conjoined.

E. CORNELL.

No. 4319.

What I claim as my invention, and wish to secure by letters patent, is the mode of holding the rivets in the holes by the use of the springs, in combination with the mandrel or the clamps, in the construction and application, as they are set forth in the accompanying specifications and drawings.

JONATHAN BALL.

No. 4320.

What I claim as my invention, and desire to secure by letters patent, is jointing the sockets that receive the standards of the ploughs to the frame, as herein described, to admit of adjusting in a vertical as well as horizontal direction, as specified; and finally, I claim the method of adjusting the front double tooth by means of the enlarged mortise and wedges, in combination with journal projections on the standards, as described.

ALLEN ELDRED.

No. 4321.

Having thus fully described the manner in which I construct my machine for scraping, smoothing, and shaping ivory comb plates, and other articles of a like character, what I claim therein as new, and desire to secure by letters patent, is the manner in which I have arranged the apparatus for carrying the plates between the cylinders, consisting of the box, the slide, with its piece, and the wheel connected by the rod to the slide,

and to the shaft by the small wheel and the gripe, heretofore described and seen in figs. 1 and 3, operating substantially as before stated.

I claim the manner in which I have arranged the top bed, whereby plates varying in thickness are equally scraped, not reducing the thickness of one more than another; said arrangement consisting of the spring and piece, as seen at figure 5, and the position of said bed, with its space, as seen in figure 7.

I claim the manner in which I have arranged the chisels for scraping, smoothing, and shaping the plate, said arrangements consisting of the levers and the cross-pieces, and the apparatus for securing the chisels to the cross-pieces, seen at figure 8, and for securing the cross pieces to the levers, as seen at figure 1, or at H H, figure 8, and for the movement up or down, for the same, by the screws, as seen at L *i*, L *i*, figure 8.

I claim the manner in which I have arranged the box to receive the plates from the top bed, consisting of the spring on the under side of the lid, seen in figure 6, and the bed, with its tapering rod, clasped by the springs under the said box, operating as before stated.

And I hereby declare that I do not intend by these claims to limit myself to the exact form or arrangement of the respective parts and combinations, as herein described and represented, but to vary these, as I may deem expedient, whilst such arrangements and combinations are substantially the same with those herein fully made known.

CALVIN B. ROGERS.

No. 4322.

Now, the new principle and invention which I, *John W. Wilson*, claim as mine, and which I desire to secure by letters patent, is the *relief truss*, attached to the truss-hoop connecting it, with the mast, to the arm, connecting it with the lever and the yard so as to permit the topmast to be lowered and raised any time at pleasure, through the relief truss, without unshipping the yard, or in anywise interfering with its motions, actions, uses, or any of its appurtenances.

JOHN W. WILSON.

No. 4323.

What I claim as my invention, and desire to secure by letters patent, is the turning of a double seam on the bottom of tin and copper ware, by the application of a bevel wheel on a shaft placed at right-angles with the shaft on which the vessel revolves, in combination with the guide on which the same rests, in order to insure a perfect rotary motion of the vessel.

DANIEL NEWTON.

No. 4324.

I claim as my invention, and wish to secure by letters patent, the combination, herein described, of parts which are designated herein, and marked in the drawings respectively, as follows, viz: the block or platform, the lifter, and the curb or pins 1 and 2; and I claim said combination of the block, lifter, and curb, whether in combination with or without the guide.

JNO. J. HOWE.

No. 4325.

I therefore claim the said inclined rail and slide, as combined with the opening of the puppet head, the same being for the object as above set forth.

In testimony whereof, I have hereto set my signature, this twenty eighth day of August, A. D. 1845.

EZEKIEL PAGE.

No. 4326.

What I claim as my invention, and desire to secure by letters patent, is the use or substitution of tubes made of a material which is a non-conductor of heat, instead of the ordinary metallic tube, between which the wick works up and down, and also the protection of the non-conducting tubes by the cap or prolongation in metal.

I do not claim any particular form of lamp, but simply the application of tubes of a non-conducting material, and the protection of such tubes from the effects of the flame of the lamp. The tubes in question may be applied to lamps of every shape and construction, and my claim is intended to cover such application.

JAMES MACLEAN.

No. 4327.

Having thus fully described the manner in which I construct my coat sector, and also that in which it is applied to the making out for cutting a coat, what I claim therein as new, and desire to secure by letters patent, is the manner in which I have arranged and combined the four arms and the neck slide; the respective arms forming the angles herein designated, or nearly such, and the second and third arms being made to slide upon each other, for the purpose of enlarging or diminishing the profile of the garment to be cut; there being also, on three of those arms, divisions, with marks or numbers corresponding with each other in their general proportion and arrangement, as represented in the drawing, and herein fully described. I will here remark that, although the divisions and numbers marked on the respective arms are considered as useful and convenient for despatch, they are not essential, as the measure taken as herein designated may be applied to the arm, and a mark be made upon it the length of the combined arms. B and C may also be determined by the same measure, and the neck slide also be moved thereby to its proper place, these three measures always being about the same.

ALLEN WARD.

No. 4328.

What I claim as my invention, and desire to secure by letters patent, is the raising spring water to a higher level than its source by the momentum of a running stream of river or other water in contact therewith, in a double ram, constructed as aforesaid, or other ram, constructed and combined substantially in the manner set forth, by which analogous results are produced—the two rams being united by an additional pipe, in which the spring and river water come in contact, as above set forth.

I also claim the combinations and arrangement of the lever, bucket, and

valve, with reservoir, as described, for keeping up the action of the machine. I likewise claim the arrangement of the spring for insuring the opening of the valve, as described.

BENJAMIN S. BENTON.

No. 4329.

Having thus fully described the nature of my improvements in the flouring mill, what I claim therein as new, and desire to secure by letters patent, is the manner in which I have arranged the flights around the bolting reel, in combination with the arrangement of the respective spouts HH and I, and with a device for altering the inclination of the bolting chest and reel, for the purpose set forth. R. C. MAUCK.

No. 4330.

I do not claim the manner of constructing a cast iron or metal railway car wheel, by making it of two covex or concave plates, or one convex and one concave plate, united to a solid or a divided hub, and a circular rim and flanch, as heretofore made; but that which I do claim, is my improved manner of constructing a wheel, by which I am enabled to cast it with a solid hub, and in other respects as I have above set forth, viz: by making it with an *undulating* plate, in combination with a concave or convex plate, or another undulating plate, as herein described.

In testimony whereof, I have hereto set my signature this twenty-third day of August, A. D. 1845.

GEORGE W. EDDY.

No. 4331.

Having thus fully described the nature of my improvement in the steam engine boiler, and shown the operation of the same, what I claim as new therein, and desire to secure by letters patent, is arranging the fire chamber or furnace of a tubular boiler at the side, so that the heat shall act on the upper half of the tubes, in combination with a diaphragm or partition and flue to carry off the flame, heated air, &c., to act on the lower half of the tubes, after acting on the upper half, as described.

And I also claim the making of the bottom of the boiler of a conical or dished form, with a meed or blow off valve in the lowest part of the concavity, in combination with the vertical tubes communicating with the bottom, in the manner herein described, to permit the deposite of the sediment, there being a water space surrounding them to induce circulation of the water up the tubes and down the surrounding space, to wash the sediment towards the meed or blow-off valve, as herein described.

JAS. MONTGOMERY.

No. 4332.

What I claim as my invention, and desire to secure by letters patent, is the combining with the spiral scroll the projecting portion of the buckets, marked X in the drawing; and in combination with the foregoing I claim the arrangement of the buckets, substantially as herein described and set forth. JOHN MECAY.

No. 4333.

What I claim as my discovery, and desire to secure by letters patent, is the before described composition of lime, sand, and charcoal, forming a cement that is impervious to water; that is to say, I claim to have discovered the use of charcoal and stone coal as a component part of plaster or cement, by which it is rendered impervious to water.

W. Y. SINGLETON.

No. 4334.

What I claim as my invention, and desire to secure by letters patent, is the suspension of the upper stone by being firmly fastened to a flange, connected with a hollow spindle through which the mill is fed, said hollow spindle having groovings around its circumference, near each end, fitting the edges of corresponding friction wheels arranged around said spindle, and the arrangement of the segment bar, all in connexion and combination, as aforesaid.

In testimony whereof, I have hereunto subscribed my name, before two witnesses, this third day of October, A. D. 1845.

JOSIAH PLATT.

No. 4335.

What I claim as my improvement, and for which I ask an exclusive right, is my mode of combining and applying two or more cylinders of circular saws, as above described, viz: by alternating large and small saws, and applying them to each other so that a large and small saw shall be opposite, and cut against each other.

In testimony whereof, I, the said Amos Lindsey, hereto subscribe my name, in the presence of the witnesses whose names are hereto subscribed on the second day of August, A. D. 1845.

AMOS LINDSEY.

No. 4336.

What I claim as new in the above described instrument, is the construction of *pockets* in combination with an abdominal *spring pad*, with descending lobes, by which it may be easily adapted to nearly all cases of inguinal hernia, securing a decided advantage over the common truss, by being much easier to the wearer, suiting it to double hernia, and preventing a rupture on the opposite side, which often occurs by wearing the single truss.

I also claim the employment of *rings* to be slipped into the *pockets* of the *front pad*, for encircling the ruptured spot, in order to contract and excite the muscle, thereby disposing the part to heat. The rings may be made of any shape, diameter, or width, that the form or nature of the rupture may require. The instrument I call "*Dr. Fleming's spring pad supporter and truss.*"

LORENZO D. FLEMING.

No. 4337.

Having thus described the nature of my invention, and the best manner I am at present acquainted with for performing the same, I would have it

understood that I make no claim to any of the apparatus herein described; nor do I confine myself thereto, although I consider the means above described the most simple and best for performing the invention.

But what I claim as my invention, is the mode of preserving potatoes in a cooked, or partially cooked state, by means of obtaining the substance of potatoes in a separated or finely divided and dried state, as described.

CHARLES SEPTIMUS EDWARDS.

No. 4338.

I do not claim the supplying the oven with heated air, by means of a flue in contact with the fire chamber; but I do claim the peculiar construction and particular arrangement of the flue in combination with the chamber and pipes, as I have arranged them in my stove, for conveying heated air through the oven, for the purpose of heating the upper part thereof, as described.

SAMUEL MYRES.

No. 4339.

I therefore claim the disk upon the extremity of the lip of the reed, in combination with a corresponding enlargement of the air passage of the reed plate, as described.

Also, bending the stem of the reed at an angle with the lip, and also so bending the same, and in the form of an inverted U; the whole being substantially as above explained.

In testimony that the foregoing is a true description of my said invention and improvement, I have hereto set my signature this eighth day of September, in the year eighteen hundred and forty five.

NATHAN B. JEWETT.

No. 4340.

All that I claim in the before described hive is the construction of the sliding trap, as aforesaid, and the arrangement of the vibrating trap, as aforesaid, for destroying the moth, arranged and operated as set forth.

In testimony whereof, I have hereunto subscribed my name this twentieth day of November, 1845.

JAMES ROBB.

No. 4341.

What I claim as my invention, and desire to secure by letters patent, is the mode of clearing pulp, to be used in the manufacture of paper, from sand, gravel, metallic and other hard and injurious substances, by means of the above described pulp-sand strainer.

WILLIAM BISHOP.

No. 4342.

Having thus fully described the nature and operation of my invention, what I claim as new therein, and desire to secure by letters patent, is the placing an independent set of bearing wheels within the frame of the loco-

motive, revolving loosely upon the main driving shaft, and adapted to an inner extra track of rails, (raised above the main track,) for the purpose of sustaining the weight of the locomotive in ascending or descending inclined planes, lifting the driving wheels from the main track of the rails, and rendering the action of the driving shaft independent of the bearing or driving wheels, when it is desired to transfer the whole power of the locomotive steam engines from the driving wheels to the endless screw, geared to the driving shaft, and its thread working into a rack of friction rollers; the whole arranged, combined, and operating substantially in the manner and for the purpose herein set forth.

EZRA COLEMAN.

No. 4343.

Having thus fully described the construction and operation of my improved bee-hive, what I claim as new therein, and desire to secure by letters patent, is the manner in which the honey or lateral boxes are arranged, in combination with a pyramidal central hive, constructed and operating substantially in the manner and for the purpose herein set forth.

AARON COLTON.

No. 4344.

What I claim as my invention, and desire to secure by letters patent, is the filter, arranged substantially as described, in combination with the cooling chamber surrounding the ice chamber, located and arranged substantially in the manner and for the purpose specified.

JOSEPH T. CRADDOCK.

No. 4345.

The main feature in my said new and improved boom saddle and jaws, which I claim as my invention, and desire to secure by letters patent, is the following, reference being had to the above description and drawings, viz: The method of constructing a saddle so as to leave a space between the mast and saddle, in connexion or combination with the insertion of the slide or slides in the jaws of the boom.

In testimony whereof, I have hereunto set my hand, this nineteenth day of December, A. D. 1845.

JAMES DAVIS, Jr.

No. 4346.

Having now described the construction of the improved machinery to be employed in the manufacture of nails, rivets, screws, and pins, I desire to be understood that I claim, in reference to the heading of metal rods or wire for the above purposes, the means of effecting what I call a "double upset," viz: by crushing the end of the rod or wire for forming the boss or head of the nail, rivet, screw, or pin, by two or more operations of a single heading-punch and pair or set of holding-dies and the sliding guides, the whole in combination as above described; the rod or wire being brought forward between the holding-dies a short distance by the sliding-guides, after the first or partial crushing of the metal has been effected, in order to

supply a sufficient additional quantity of metal to complete and perfect the form of the boss or head when the second pressure of the punch is brought up against it. As respects the pointing of pins, and discharging them from the machine, I claim my improvement therein; the same consisting in imparting to the sliding-bar certain alternating, lateral, and back movements in its bearings, as described, whereby the pins are turned in opposite directions during the action of the mill-roller upon them, and discharged from the machine when the pointing of them has been completed.

In witness whereof, I, the said Samuel Godfrey Reynolds, have hereunto set my hand, this eighteenth day of August, one thousand eight hundred and forty five. S. G. REYNOLDS.

No. 4347.

What I claim as my invention is the mode, herein described, of applying medicated vapors; that is, by submitting the body or parts thereof to the vapor of the substance used, without the presence of steam, by means substantially the same as herein set forth.

BENJ'N SWETT.

No. 67—Reissue.

Having thus fully described my invention and improvements in generating and applying heat, I proceed to specify more particularly what I claim as my invention and improvements.

1st. I claim the collecting and drawing off the combustible gases, chiefly consisting of *carbonic oxide gas*, from blast-and other furnaces, at *one or more points below the top of the fuel in said furnaces*, substantially as set forth in the above specification, for the purpose of employing said gases instead of other fuel for the heating of all kinds of furnaces used in the various processes of manufacturing and working iron and other metals, and for the heating of steam boilers or any other structures requiring a high temperature.

2d. I claim the above described mode, or any other substantially the same, of generating combustible gases from any kind of fuel, in separate furnaces or chambers, and conducting the same to other furnaces or structures that are to be heated by the combustion of said gas.

3d. I claim the above described mode, or any other substantially the same, of forcing, through a system of blowpipes or in any other convenient manner, heated air in numerous small streams, and under a pressure greater than that of the atmosphere, into the same combustible gases in the furnaces or structures, where the same are to be used for the purpose of producing, by the rapid and intimate mixture of the heated air with combustible gases, their immediate and complete combustion.

In testimony whereof, I, the said Christian Edward Detmold, subscribe my name, in the presence of the witnesses whose names are hereto subscribed, on the 8th day of January, A. D. 1845.

C. E. DETMOLD,
Assignee of Wm. Von Faber du Faur.

No. 68.

Having thus fully given an exemplification of the manner in which I

combine and arrange the respective parts of my improvement when applied to a pudding furnace—from which description any competent person will be able to adapt it to other purposes—I wish it understood that I do not claim as my invention the employment of carbonic oxide gas in combination with heated atmospheric air, this being known as the invention of William Von Faber du Faur, upon which this is intended as an improvement; but what I do claim as my invention, is the combination of a reverberatory furnace, having a deep fire-chamber for the special purpose of generating combustible gases from any kind of fuel, as above described, with an arrangement of blowpipes, or other convenient apparatus, through which continuous jets of highly heated atmospheric air are forced into the combustible gases in their passage over the fire-bridge, for the purpose of producing their perfect and rapid combustion, substantially as set forth in the above specification.

In testimony whereof, I, the said Christian Edward Detmold, hereto subscribe my name, in the presence of the witnesses whose names are hereto subscribed, on the eighth day of January, A. D. 1845.

C. E. DETMOLD.

No. 69.

What I claim as new, and desire to secure by letters patent in the above described apparatus, is the combination of the float with the valve, steam engine, and supply pumps, substantially as herein described, so that the depression of the float, caused by a deficiency of water, shall open a valve, and that the steam which escapes through said opening shall drive an engine to operate the supply pumps.

ISAAC N. COFFIN.

No. 70.

Having thus given a full and exact description of the manner of constructing the plough invented by John Deats, and shown the operation thereof, what is claimed therein as constituting his improvements, is—

1st. The manner in which the main land-side piece is combined with the mould-board by means of the piece cast into the land side, and fitting into the recess prepared for it on the front edge of the mould-board, the two parts being drawn together by means of a wedge entering the space, as set forth.

2d. The manner herein set forth of forming and combining the bottom land-side piece, by which form and combination this piece is rendered reversible, and capable of regulating the pitch of the plough, as set forth.

3d. The manner of forming and combining the reversible cutter, extending from point to rear of the upper part of the land side, so as to constitute a part thereof, and being capable of being set forward to any required extent, from the manner in which it is connected to the main land-side piece.

4th. The manner of confining the combined share and point in place, by means of the bolt passing up through the sheath, the bolt, and the recess, and tongue.

5th. The particular manner of combining the clevis with the piece let into the end of the beam, so as to operate in the manner described.

HIRAM DEATS.

No. 71.

Having thus fully described the parts and combinations of parts and operation of the machine for planing, tonguing, and grooving boards or planks, and shown various modes in which the same may be constructed and made to operate without changing the principle or mode of operation of the machine, what is claimed therein as the invention of William Woodworth, deceased, is the employment of rotating planes, substantially as herein described, in combination with rollers, or any analogous device, to prevent the boards from being drawn up by the planes when cutting upwards, or from the reduced, or planed, to the unplaned surface, as described.

And, also, the combination of the rotating planes with the cutter-wheels for tonguing and grooving, for the purpose of planing, tonguing, and grooving boards, &c. at one operation, as described.

And, also, the combination of either the tonguing or the grooving cutter-wheel for tonguing or grooving boards, &c., with the pressure rollers, as described; the effect of the pressure rollers in these operations being such as to keep the boards, &c. steady, and prevent the cutters from drawing the boards towards the centre of the cutter-wheels, whilst it is moved through by machinery in the planing operation: the tendency of the plane is to lift the boards directly up against the rollers; but in the tonguing and grooving, the tendency is overcome by the friction occasioned by the pressure of the rollers.

WILLIAM W. WOODWORTH,
Administrator of William Woodworth, deceased.

Note.—The above claim of William Woodworth's patent (by William W. Woodworth, administrator) was extended by the board of commissioners, under the 18th section of an act of Congress, approved 4th day of July, 1836, for seven years from the 27th day of December, 1842.

And, also, by an act of Congress, approved March 3d, 1845, the above patent is extended seven years from the 27th day of December, 1849.

No. 72.

Having thus fully described the construction and operation of the machinery for manufacturing screw augers, what is claimed therein as new, and desired to be secured by letters patent, is, first, the manner herein described of arranging and combining the shaft, the roller, and the appendages, constituting the machine for twisting the common double twist auger, as set forth, whether the same be made in the precise form described, or in any other that is substantially the same, producing a like effect by like means. Secondly, the manner of forming the lip or lips, and the pintle for the centre worm, either on double or single twist augers, by means of die or swage, combined, arranged, and operating as herein made known.

EZRA L. HOMMEDIEU.

No. 73.

What we claim as our invention, and wish to secure by letters patent, is as follows:

1. We claim the combination of parts, consisting of the wheel, the pintle, and the two distinct bearings, or bearing pieces, said bearing pieces being made as set forth; that is to say, being made in a cylindrical or other anal-

ogous form for the purpose of suiting them to be inserted in a hole, as set forth.

2. We claim the combination of parts, consisting of the wheel, the pintle, and the upper bearing; said pintle and bearing being made and adapted to each other substantially in the manner set forth.

3. We claim the flange on the pintle, located and made thereon in the place and manner and for the purpose set forth.

ELI W. BLAKE.
JOHN A. BLAKE.
PHILOS BLAKE.

No. 74.

What we claim as our invention, and wish to secure by letters patent, is the combining of the pintle directly with the wooden leg of the furniture, without the intervention of the sheath, or other appendage of metal, heretofore employed, the same being done in the manner herein set forth; that is to say, the pintle being made of sufficient length to adapt it to that end, as described, and inserted into a hole in the leg, bored of such depth as that the burden may rest upon the upper end of the pintle.

PHILOS BLAKE.
ELI W. BLAKE.
JOHN A. BLAKE.

No. 75.

Having thus fully set forth the improvements of the said Jonas Rouse, according to the best of our knowledge and belief, what we claim therein as his invention, and desire to secure by letters patent, is the method of turning or bending the tongues of hinge or butt plates, and forming them into eyes, as described, by placing them on a flat surface of a die, having a projection therefrom against which the tongues of the hinge plates are forced by a follower so as to bend them round into eyes, substantially in the manner and for the purpose above specified.

JAMES ROY.
JOHN KNOWER.
BEN. KNOWER.
ANDREW ROY.

No. 76.

What I claim as new in the above described wick, and desire to secure by letters patent, is the lamp-wick made or combined with twine, a strip of tape, muslin, cotton, flannel, or other analogous substance, so as to form the *strip* of a *thin*, *close*, or *hard* substance in the centre for the roller to act upon, and to form a *thick*, *loose*, or open substance of candle-wick, or other analogous material, on each edge or side, for the oil or other fluid to ascend up, in the manner and for the purpose above set forth, or in any other way that is substantially the same.

Witness my hand this fifteenth day of July, A. D. 1845.

SAMUEL RUST.

No. 77.

Having thus fully described my improvement, what I claim as my invention, and desire to secure by letters patent, is elevating the former (properly

shaped, to give the described form to the brim of the hat) from the bench or stand on which it rests, to enable the workman to apply the iron to and turn the edge of the brim, substantially as herein described.

FRANCIS DEGEN.

Patents extended, by act of Congress approved July 4, 1836, *for seven years.*

What I claim as my invention or improvement is the application of the flanches of the wheels on one side of railroad carriages, and of the treads of the wheels on the other side, to turn curves upon railways, particularly such as turning the corners of the streets, wharves, &c., in cities and elsewhere, operating upon the principle herein set forth.

JAMES STIMPSON.

What I claim as my inventions and improvements is the employment of plates or rails, either of cast or wrought-iron, constructed upon the principle or in the manner herein described, having narrow grooves for the flanches to run in, by which they are perfectly adapted to the unobstructed passing of all kinds of carriages used in streets over them; the running of the peripheries of the flanches, or of the cone or rise on the tread of the wheel, upon the rail, in the manner and for the purposes set forth, and the employment of plates upon cast-iron, upon the principle described, for the crossing of gutters and the turning of curves; and I do hereby declare that I do not intend to confine myself to the precise forms and dimensions given, those being intended merely to exemplify, in a clear manner, the nature, object, and mode of carrying into effect my said inventions.

JAMES STIMPSON.

Additional improvements to letters patent.

No. 72.

Having thus fully described my improvements, what I claim as my invention, and desire to secure by this addition to my letters patent, is the combination of the packing springs with the hydrant cock, constructed and arranged substantially in the manner and for the purpose herein set forth.

ROBT. R. COLVIN.

No. 73.

What I claim as my invention, and which I desire to have added to my letters patent, is constructing the rake with an additional head placed in front of and parallel to the rear head, into which the ends of the wire teeth are secured, (as described in my former patent,) and coiling the pieces of wire of which the teeth are composed around the said additional head, and extending down in front of the head in the form of a cima-reversa, or modern scroll, forming the requisite elastic curved teeth for raking the hay, as described.

It will at once be perceived that a greater degree of elasticity is secured to the teeth, while at the same time the strength and utility of the rake are greatly augmented.

HEZEKIAH HAYNES.

No. 74.

And the application of this piece between the inner and outer parts of the thumb bow, for these purposes, constitutes my whole and sole claim in this addition to my original specification and patent.

In witness whereof, I have hereunto set my hand, in the city of New York, this twenty third day of May, one thousand eight hundred and forty-five.

HERMANN WENDT.

No. 75.

What I claim as my invention in the above specified improvement, and desire to secure by letters patent, is to construct the dial in the manner described, so as to give* mean time by the use of the line drawn, as herein set forth.

JAMES P. GARDNER.

No. 76.

What I claim as my invention, and desire to secure by letters patent, as an improvement on the bailing wheel, is the use and construction of the elastic or yielding bucket, with the bulkhead, as herein described.

HORACE D. FORBES.

No. 77.

What I claim as my invention, and desire to have added to my existing patent for an improvement in cooking stoves, consists in the combination of the angular flues with the revertible flue, constructed between the ovens for conducting the draught under the small oven, arranged in the manner and for the purpose set forth; that is to say, for heating the bottom of the small oven without the necessity of passing the draught around the large oven.

WILLIAM L. POTTER.

Designs granted, during the year 1844, *for seven years.*

CLAIMS.

No. 27.

What I claim as my invention, and desire to secure by letters patent, is the design for an ornamental parlour stove, represented in the accompanying drawings.

ADDISON LOW.

No. 28.

What I claim as my invention, and desire to secure by letters patent, is the new shape or configuration produced by forming a trough around the top of the bowl of a glass lamp, and just below the neck of the same, substantially in the manner set forth.

P. F. SLANE.

---

* There is a very small vibration from mean time, only amounting to one minute in something over seventy years.

No. 29.

What is claimed, therefore, as new, and for which I ask a patent, is the peculiar shape or configuration of the combined fire-chamber, radiators, and pedestals, as herein described and represented.

CHARLES S. HINE.

No. 30.

I am fully aware that various articles of metal have been so formed as to have their legs, or other parts, connected together by mechanical arrangements similar to that by which I connect the respective parts of my tripod, and I do not, therefore, claim to have invented anything which could become the subject of a patent for a combination of parts substantially new in their general combination and arrangement, but I limit my claim, as above stated, to the special shape or configuration of the respective parts, as devised by me, and herein set forth.

GILMAN JOSLIN.

No. 31.

What I claim as my invention, and desire to secure by letters patent, is the combination and arrangement of ornamental figures, herein described, forming an ornamental design for a stove. S. H. RANSOM.

No. 32.

What I claim as my invention, and desire to secure by letters patent, is the conformation and arrangement of figures of fruits and foliage, as represented in the annexed drawing.

I do not claim the form or arrangement of the stove, but only the conformation and arrangement of the figures aforesaid.

EZRA RIPLEY.

No. 33.

What I claim as my invention, and desire to secure by letters patent, is the design, shape, configuration, style, and ornamental carvings of the external surface of the plates of the stove. ANSON ATWOOD.

No. 34.

What I claim as original, or as my own invention, is the general design and combination of the several ornamental parts of the stove.

Also, the design of the doors and feet to the stoves; but do not claim to be the inventor of the different parts of the stove, except as above set forth."

DAVID ROOT.

No. 35.

What I claim as my invention, and desire to secure by letters patent, is the ornamental arrangement and form of the sides and ends, and the ornamental part of the bottom, as shown by the drawings. The plan of the top is shown by the dotted line on figure A.

ELIJAH P. PENNIMAN.

No. 36.

What I claim as my invention, and wish to secure by letters patent, is the design, here represented in the drawings and model, of a stand for placing or hanging hats, cloaks, coats, umbrellas, and other articles upon, whether it be made in iron or other metal, composition, wood, or other materials. WILLIAM L. MILLER.

No. 37.

What I claim as my invention, and desire to secure by letters patent, is the combination of figures or ornaments shown in figures 2 and 3, and especially the compositions upon the oven and fire doors.

ADDISON LOW.

No. 38.

And I hereby declare that I am the original producer of the said bust of the Hon. John C. Calhoun, aforesaid, and that I claim to obtain an exclusive property, or right therein to make, use, sell, and vend the same, or copies of the same, to others, or by them to be made and sold.

CLARK MILLS.

No. 39.

What we claim as our invention, and desire to secure by letters patent, is the design, shape, configuration, style, and ornamental carvings of the external surface of the plates of the stoves.

JOHN S. PECKHAM.
MERRITT PECKHAM.

No. 40.

I have thus described and represented the respective parts of my newly designed stove, so far as its configuration and ornament are concerned, and I claim the exclusive right to the use of the plates A and B, thus shaped and ornamented, also in the manner represented in the drawings; and also the particular shape and ornamental design of the top plate thereof, as represented. HENRY STANLEY.

No. 41.

What I claim in my invention, and desire to secure by letters patent, is the peculiar style of ornamental carving on the surface of the plates, and the peculiar elevations and depressions of the surface, as represented in the drawings. EZRA RIPLEY.

No. 42.

What I claim as my invention, is a design of a new and ornamental stove plate, as herein described. CALVIN FULTON.

No. 43.

What I do claim, therefore, is the peculiar carving and combination of figure work and configuration, in such a manner and combination with this particular form of stove, and it is to be expressly understood that I claim nothing more. EZRA RIPLEY.